

PROCEEDINGS

PARAMETERS OF POSTURE AND
MOBILITY IN THE BLIND

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FOREWORD

In October, 1968, a conference on "Parameters of Posture and Mobility in the Blind" was held at the Illinois Visually Handicapped Institute, Chicago, Illinois. This conference was primarily for the benefit of mobility specialists and physical therapists working with the blind population in the United States. The purpose of the meeting was to explore, through lectures, workshops, panels, and demonstrations, newer philosophical, experimental, and clinical concepts in the diagnosis and treatment of the blind and the blind multiply handicapped. Such topics as Doman Delacato techniques, Montessori training, postural reflexes, kinesthetic boundaries in art, and body image reinforcement were discussed and evaluated.

The conference was unusual because of the cross-disciplinary exchange of ideas made possible by a nationally selected group of experts in psychology, education, physiatry, kinesthetics, physical education, and orientation and mobility. This publication of its proceedings represents most of the papers delivered at the meeting. It is our hope that the ideas presented herein will be of continued value to practitioners in the field of rehabilitation of the blind. It is also hoped that such conferences can be a regular event in the future. The genuine grassroots support on a national level was most encouraging, sixteen states and Canada attending.

Special thanks is extended to the following: The Department of Children and Family Services, State of Illinois, Edward T. Weaver, Director, for allowing the Illinois Visually Handicapped Institute to sponsor the conference; Irwin M. Siegel, M.D., who helped plan the conference; Western Michigan University, Kalamazoo, for publishing these proceedings.

Thomas J. Murphy,
Superintendent
Illinois Visually Handicapped
Institute

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TOTAL MOBILIZATION: THE POSTURE OF PROGRESS

By

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I take special pleasure in welcoming you to a city famous for its mobility--some of the most celebrated marches in the world have taken place here. In fact, if Chicago has a theme song, it is probably, I DON'T WANT TO WALK WITHOUT YOU, BABY. Perhaps this fixation accounts for my original misunderstanding of the topic for this conference, which I took to be PERAMBULATORS OF MOBILITY. Not, mind you, that I've anything against perambulators. A wheelchair is after all merely a perambulator grown up. More than once have I put my faith in a wheelchair and fleet-footed porter when racing to catch a plane at the airport.

A key-note address should be "key" in the sense of unlocking thought and a "note" in the sense of being an opening fanfare rather than a full symphony. My purpose this morning is, therefore, not to expound but to excite, not to orate, but to stimulate. On some points we shall probably all agree. Great minds frequently do. Some of my other statements may incite more apoplexy than applause, in which case I can just claim that OVERstimulation is a recognized occupational hazard of being a key-noter.

To the average man--that hypothetical creature whom only a computer has met--the word POSTURE still bears the old military meaning--stomach in, chest out, chin in, head up, eyes forward. I suggest that in the broadest sense, posture refers to our attitude--both physical and psychological--toward life and in the world. Physical posture is our attitude or position in space. Psychological posture is our attitude toward the problems and experiences of life. The two types of posture are interdependent and in a sense inseparable. When John Milton wrote his famous line, "They also serve who only stand and wait," he certainly did not mean a stance of lax and hopeless resignation. Rather, he meant a posture of quiet but hopeful expectancy, of READINESS TO RESPOND. We can sit in such a way as to be ready to rise. We can stand in such a way as to be ready to walk. We can walk in such a way as to be ready to run. Good posture, then, whether static or mobile, is an attitude of balance, of poise, of readiness to respond.

The word MOBILITY also has military overtones, as with a mobile division. I suggest that mobility may be broadly defined as the freedom and competence with which we move in the world--or make portions of the world

move to us. I shall explain this latter concept in a few moments, but here let me say that mobility, like posture, involves both the physical and psychological. Consider, if you will, the tragedy of the speaker who strides to the podium while his mind sits pat in the audience!

From the physical standpoint, mobility was at one time regarded as a more or less unrelated grouping of specialities useful in overcoming blindness. Champions of the guide dog raised dogs. Champions of the long cane raised cane. Some blind people scorned both dog and cane and placed their faith in echo perception. Many blind gentlemen of my acquaintance still think you can't beat the right arm of a pretty girl. I am sure that the first non-profit institution to advertise "Go-go Girls for the Blind" will have solved all its fund-raising problems. Fortunately, the realization is growing that the method by which a given individual can achieve maximum mobility is open to selection according to the background, experience, interests, aptitudes, and needs of the individual. More and more, specialists are consulting one another as here at this conference. More and more, the specialist himself is acquiring a cluster of competencies, so that he may help the client choose wisely from alternative possibilities. I heartily approve the attitude of the rehabilitation center in Israel where I was told two years ago by the chief administrator that the center already teaches use of both the guide dog and the long cane and would add electronic devices as they become available.

The eclectic attitude toward mobility is shared at the Hadley School, where we have staff members currently using the guide dog, the cane, the Beltone-Ultra Sonic Aid. A few days ago we conducted a special seminar in the use of the Sonic Aid for certified mobility instructors eager to broaden their backgrounds. It is not that we feel electronic devices are necessarily the wave of the future in mobility for the blind, but simply that we believe in total mobilization of all possible resources as the most effective posture of progress.

The quest for professional competence is in every way commendable. He who would teach others must know whereof he teaches. Our standards should always be so high that we must reach in order to grasp them, grow in order to surpass them. But in our pride as professionals, let us always retain the humility to be simply human, the flexibility to learn from those we seek to help. In the course of life that is no longer a short, short story, I have walked the streets alone with a cane and would still be doing so did not arthritis make such solo navigation inadvisable. I have traveled alone to San Francisco and back by taxi and plane; and I have been privileged to lecture in some twenty countries during the past three years, traveling under escort by plane, train, bus, jeep, ferry, and wheelchair. And I can tell you that everywhere I found handicapped people doing things they

theoretically shouldn't have been able to do. People just don't sit resignedly in their rocking chairs, waiting for the peripatologists to hike over the mountains. Sometimes we can crystallize the determination to try. Often we can help them try more wisely, more successfully. We can blow on the coals without claiming either to have lighted the fire or grown the wood!

Did you know that in Chicago a totally deaf-blind woman lives alone with her aged and convalescent mother, to whom she acts as housekeeper, companion and nurses' aid? With the two beds side by side, she pins her blanket at night to the mother's bed, so that the mother can waken her if needed by tugging. When the partially paralyzed mother rises in the morning, the deaf-blind daughter supports and guides her about the apartment. How shall we teach the courage that makes such mobility possible?

Nevertheless, there are things we can do. I leave you with two thoughts not often discussed in the field of mobility.

The first is the mobility of attraction, by which I mean that if Mohammed cannot go to the mountain, the mountain can sometimes be attracted to Mohammed. I have a friend, for example, who weighs somewhat more than three hundred pounds. Understandably, he prefers his own home to biking about the countryside. On a typical evening you will find his basement well crowded with friends who come to share his extensive hi-fi equipment, take advantage of his free repair service for their own pet gadgets, possibly lighten the liquid contents of his well-stocked refrigerator. Any shut-in, any bedfast person, can be helped to find ways of applying this principle of mobility by attraction. After all, should not the drop of honey that attracts flies rate as high a status as the fly that goes out looking for honey?

Finally, I bring to your attention the concept of mobility of the mind. To quote Milton again, "The mind is its own place." Teach a blind person to use the telephone effectively, teach him the importance of telephone courtesy and the voice with the smile, teach him the innumerable types of information that can be acquired by phone--and you will give him the equivalent of a vital new means of mobility. Equally important is the conquest of distance by mail, as illustrated by the free brailled and recorded tutorial courses by mail of the Hadley School for the Blind. A new course about to join the Hadley curriculum is FIRST AID BY THE BLIND, which will be based on a non-visual presentation especially prepared for us by our flexible and imaginative chairman today, Dr. Irwin Siegel himself.

There's a pot of gold at the foot of the rainbow--the gold of vital service to fellow human beings. May this conference help us find it!

WHY MOBILITY NOW?

By

Dr. Berthold Lowenfeld

Noted educator, psychologist, author, past and present member of numerous governmental agencies, and recipient of the American Foundation for the Blind's Migel Medal

My topic, as you can see from the program, is "Why Mobility for the Blind Now?" When I think of mobility, I automatically include posture too because I think that the two cannot be separated either in function or in the person who is pursuing the teaching of them. I would like to start by presenting to you my concept of the history of the status of the blind in Western society.

There are four phases in this history which are distinctly different and in each one of them the status of the blind shows, I believe, decided progress. The first stage is that of Separation, and I am talking about this historically as well as sociologically. In many primitive societies, and also during historical times, the blind were regarded as liabilities and their status was that of separation. In tribal life any person who could not fend for himself and defend himself, was usually considered a liability. The two extreme forms of separation are annihilation and veneration. Annihilation of the blind and of imperfect children was practiced, for instance, by the Spartans who set them out in the wilderness of the mountains and left them to starvation. In Athens, a center of great culture, they were put into clay vessels and left by the wayside. In Rome, it was an accepted practice that baskets were sold on the markets so that infirm children could be put into them and floated down the Tiber river in which they finally drowned. These practices were legitimate under the laws of Lycurgus in Sparta and of Solon in Athens. Plato, Aristotle, and Seneca approved them in theory. R. S. French stated in his FROM HOMER TO HELEN KELLER, "Among the more primitive peoples the right to live must have been denied the later blind equally with those born blind. The individual was valued for his fitness for practical life and for his availability for war."

On the other hand, we know of some ancient blind people who were venerated by their contemporaries; for instance, Homer, who is believed to have lost his sight rather early in life, and a considerable number of other Greek and Roman bards and philosophers, among them Demodocus, the "bard divine" and the prophets Tiresias and Phineus. This veneration is the benevolent form of separation, because essentially it also removed

blind individuals from the normal stream of life. Either form of separation can be found in other early societies, and even in historically not too remote times among primitive people. It was also practiced, not long ago, as genocide among those who regressed into savagism. I'd like at this point to indicate to you that I believe these historical sequences are not only the sequences through which the human race had to go, but that individually and collectively some persons and some agencies dealing with the blind go through the same stages. Some of them remain fixated at some of these stages, and I am sure you will, from your own experience, be able to identify some of the agencies that are still operating within the framework of a historically past attitude.

The second step in this review of the status of the blind in society and of societal attitudes toward them, is that of the Ward Status. In Western society, the advent and rise of the monotheistic religions led into this second phase in which the blind were regarded as wards of society. In the Old Testament we find such protective remarks as, "Thou shalt not curse the deaf nor put a stumbling block before the blind," and "Cursed be he that maketh the blind to wander out of the way." Hebraic law puts great stress upon each individual's obligation toward the needy, including the blind, and the family was responsible for the welfare of all of its members. Christianity always considered children, the aged, and the blind as special wards of the Church, and it is interesting to note that these three groups still constitute the three categories in modern social welfare legislation. In the early christian communities, the Deacons took special care of the blind, and wealthy christians took blind people into their households as their special wards.

I am coming now to the third stage which I call the era of Self-Emancipation. Under the ward status which gave the blind not only the right to live but also accorded them protection and assistance, some blind individuals became well known as bards, singers, and musicians. However, from the beginning of the 18th century on, there appeared throughout the Western world blind persons who by their own efforts achieved not only an education, but also became outstanding in various fields of endeavor. This phase I propose to call that of self-emancipation. I would like to give you some examples of such self-emancipators whose collective appearance and achievements resulted in the establishment of educational facilities for the blind throughout the civilized world.

Nicholas Saunderson, 1682-1729, lost his sight through smallpox at the age of one year. This Yorkshire man became one of the outstanding mathematicians of his time, and through the urging of the famous Sir Issac Newton, he was appointed Lucasian Professor of Mathematics at

Cambridge. He lectured on Newtonian Laws and Optics, and became a Fellow of the Royal Society.

John Metcalf, 1717-1810, was also blinded by smallpox when six years old. He traveled around England by himself, mostly by walking, and he studied mensuration, contracted for road construction, and became well known as an Engineer. He was, again according to French, "one of the first to use crushed stones for making roadbeds," and he also became a bridge-builder.

Francois Huber, 1750-1831, was born in the French part of Switzerland. He became totally blind as a result of cataracts and consumption. Because of his poor health he moved to a country place and became a Naturalist, specializing in, of all things, the life of the bees. His wife and a perceptive servant assisted him with his studies. This means that they provided him with the facts and data observed, and he brought them into a scientific concept. Thus, he became an outstanding authority on the life and habits of bees. His discoveries of the functions of the queen and the other bees in the hive, his observations on the use of their antennae, on their breathing, on their flying, moved Maurice Maeterlinck to the statement: "His New Observations on Bees has remained an unfailing, abundant treasure into which every subsequent writer has dipped. There is not a single one of his principle statements that has been disproved, or discovered in error; and in our actual experience, they stand untouched and indeed at its very foundation." Maeterlinck's own Life of the Bees is one of the outstanding books that has been written on this topic.

Another of these self-emancipators was Thomas Blacklock, 1721-1791, born in Scotland, who also lost his sight from smallpox. As a parenthetical remark, most of the people I mentioned lost their sight as a result of smallpox, a cause of blindness that doesn't exist any more, but existed when I came to work for the blind some forty years ago. Some of our children, but particularly older people who were blind, had pock marks in their faces, and their sight was lost as a result of smallpox which attacked their eyes. Now, Thomas Blacklock lost his sight from smallpox before he was six months old. He began to write poetry and studied for the ministry. Although he achieved great fame as a preacher and was an ordained minister, the prejudice of his contemporaries prevented him from a Parish career. His poetry, however, was published, and he also made translations from the French into English. He became the intimate friend of the philosopher David Hume, he furthered Robert Burns, and befriended young Walter Scott.

Maria Theresia von Paradis, 1759-1824, became blind before three years of age. The cause is not known. She showed unusual talent, intellectually and in music. She was an Austrian and a protégée of Empress Maria Theresia of Austria. She undertook many trips throughout Europe as a concert pianist. She had entrance to European high society and became herself a center of social life. Ishbel Ross in her book, Journey Into Light, tells how Maria became involved with Mesmer and with mesmerism and "emerged from this experience a creature of mystery and romance."

All these and many other self-emancipators among the blind not only achieved outstanding results in their many feats of endeavor, but also devised a variety of techniques and skills which enabled them to accomplish their achievements in spite of their being blind and in spite of the lack of any educational facilities for the blind. There are many others who struggled for an education by inventing their own techniques for communication and acquiring an education. Among them are those who devised various ways of writing, of doing arithmetic and even higher mathematics, of corresponding with each other, and of making embossed maps and other appliances of which they were individually in need. These self-emancipators encouraged the founding of the first educational institutions for the blind and inspired particularly Valentin Haüy, who established the first school for blind children in Paris in 1784. There were other influences, too, among which, the writings of Diderot and Rousseau, and the example of Abbe de L'Epee in founding the first school for the deaf, must be mentioned. However, the achievements of blind people themselves were the most important single factor which, by itself, provided, as we would scientifically say, the "necessary and sufficient conditions" for the establishment of educational provisions for blind children.

This leads us, actually, into the fourth period, the era of Integration of the Blind into Society. With the educability of the blind an established fact, integration began. For the purpose of this paper, integration is defined as follows: "Integration is the mutual acceptance, based on equality of opportunity and before the law, between groups which differ in some important characteristic, may it be racial, religious, physical, or otherwise." Since the founding of the schools for the blind, many changes have occurred which justify the contention that we live in a period in which the integration of blind people into society is gradually becoming a reality. If we review the past five decades, the world has seen great changes. The aftermath of the first world war, the great depression, the second world war, the atomic age, and now the age of automation. During these years events in work for the blind have taken place, particularly in the United States, which are no less revolutionary for our field.

First, I would like to discuss with you, in short only, the rise in public school education for blind children in the United States. The first public school classes for blind children were set up in Chicago in 1900. After the first years of moderate growth, the enrollment leveled off and remained proportionally the same for many years. It amounted to no more than 10 to 15 percent of the total blind school-age population. From 1952 on, the enrollment in the public school programs showed a steady and sharp increase, largely due to the retrolental fibroplasia caused increase of blind children and the demand of the parents of these children to keep them at home and have them educated in their local school systems. At present, about 60 percent of all registered blind children are enrolled in public school programs and the remaining 40 percent attend residential schools. There are other changes in the education of blind children which point also in the direction of integration. Residential schools for the blind have, by and large, turned from more or less "closed" schools into "open" schools, thus following the trends which characterize changes in public school education also. Personnel in these schools, particularly the teachers, are required to be professionally trained and certified in their areas of specialization. Administratively, most residential schools now function under State Departments of Education and not as previously under all kinds of departments of institutions. Thus, they have become integral parts of the public school systems of their states.

Public school programs have also undergone changes. They started, as you may know, as separated braille classes where a teacher taught a group of blind children in a special room located in a public school. Under this arrangement the children had little, if any, contact with the sighted children. Now we have the resource room arrangement where the blind child is placed in the regular classroom and assisted by a resource teacher when needed, or we have itinerant teachers who may give advice to the regular teacher, and also to the student, and supply him with the necessary equipment so that he can follow the regular instruction in the classroom with his sighted peers. At the present, teacher training which about twenty or thirty years ago was offered at one or two residential schools only, is pursued in many teachers colleges and universities as a part of the regular course program offered by them.

In the field of work for the adult blind, equally important changes have occurred which are significant for the trend toward integration. Foremost among them is the change which has taken place in vocational rehabilitation and in its underlying philosophy. Some fifty years ago, the prevailing practice was to assume that "the blind" could do only certain types of work and for these types, like broom making, brush making, basketry, etc., they were prepared in schools and trained in workshops for the blind. Our present day approach is completely turned around. We determine where the individual

blind person's aptitudes and interests lie, provide him with training in the kind of work for which he is best suited, no matter whether any blind person has done it before, and then assist him in being placed in the field for which he has been trained successfully. The Administrator of the Social and Rehabilitation Service, Miss Mary E. Switzer, expressed this approach as follows: "The Vocational Rehabilitation Administration is committed to a program of intense promotion of vocational individuality for blind people -- to safeguard them against being herded into lines of work convenient to society, but crushing to personality, to find instead a lifework which by its very nature gives the greatest possible opportunity for functioning of each unique combination of talents." The legal framework for this advance was in the United States provided by the Vocational Rehabilitation Act, particularly by its 1954 Amendment, and the Vocational Rehabilitation Administration, now the Social and Rehabilitation Service, has used it boldly and imaginatively to build up strong programs serving all disabled citizens. This complete change in approach has resulted in an increased influx of blind people into private industry, private enterprise, and into the professions.

There are other factors which support the thesis that we live in a period of integration of the blind into society because this trend permeates most of the activities in work for the blind. Let me refer to just a few of them. More blind people than ever before live in the United States with their own families. About half a century ago, most agencies for the blind conducted as an integral part of their services, homes for the blind--sometimes one for men and one for women. If we survey the field now, we would find that most of these institutions have ceased to operate and their demise is deplored by few, if any. This is in line with the integration of the blind into society. Blindness, according to its legal definition, comprises a wide range of visual functioning, from total blindness to considerable residual vision. You know that there have been efforts to restore vision and to help people by optical aids to gain the optimum vision of which they are capable. This has, in fact, normalized the status of many hitherto "blind" people. College education has become generally much more widely spread among the blind than it was before World War II. In most of these achievements blind people themselves have played an increasing role. In such organizations as the National Federation of the Blind, they have themselves assumed leadership in promoting legislation on behalf of the blind and in other phases of work for the blind. This tendency also shows up in the ever growing number of executives and employees of agencies serving blind persons who are themselves visually handicapped. I'd like to quote from an essay of Dr. Jacobus tenBroek, the famous blind legal authority at the University of California, in which he adds to the factors which I have already mentioned, some other legislative programs

which promote integration, the public assistance titles of the Social Security Act, the so-called architectural barriers statutes, the guide dog laws, and the white cane laws. He asserts that they "are built on an integrationist foundation and necessarily imply an integrationist objective." He comes to the following conclusion: "From the foregoing, it is abundantly clear that integration of the disabled is the policy of the nation. This policy has been expressed by Congress and by the state legislatures, not once, but many times, and not merely with respect to a single, narrow area of human endeavor, but with respect to the whole broad range of social, economic, and educational activity backed up with numerous specially created agencies and instrumentalities of government, with affirmative assistance and negative prohibitions, and with vast expenditures of money amounting to hundreds of millions of dollars each year."

With his historic background, I can and need devote only a few minutes to answer the question, "Why mobility for the blind now?" Certainly, during the three first stages that I have discussed with you -- during the stage of separation, of the ward status, and even of that of self-emancipation -- mobility had little or no importance to the great masses of the blind. Actually, they would not have known what to do with it because of the restrictions imposed upon them by their social environment and the public attitudes. Even fifty years ago, education of the blind and provisions for the adult blind, gave them what one could call a "cradle to grave" security, on the lowest level and without personal freedom or dignity. They went to a residential school, graduated from that residential school after having learned a trade, and went, usually on the same campus but separately, to a workshop for the blind. There they worked until they were too old to work and were then transferred, again often on the same campus, to the home for the aged blind. This is what I mean by "cradle to grave" security. Mobility was not required because they moved around only in familiar territory, and in that they were safe as long as they did not have to leave it and to go out into the world at large.

With the integration of the blind, though not yet fully established but initiated and making progress, as we hope, the need for posture and mobility became acute. Good posture became necessary because by not showing acceptable posture, the blind person would call attention to the fact that he is blind and that he cannot imitate what others learn visually -- if they want to learn it. That means by lack of good posture, and also by the fact that he cannot move about, the blind person's status in society, his personal status, family status, economic status, and status in the group, would be seriously jeopardized. The blind person who is immobilized or whose mobility is confined only to the area with which he is familiar, is not a person who can readily integrate. In our efforts for

integration, mobility and posture play an essential role.

I might conclude with this observation. Mobility instruction, as we know it today, was really founded about 25 years ago with a group of young people who had become blind as a result of action in the war. This group was a potentially active group, in the best years of their lives. They had frequently aims and goals that they had set for themselves when they still had their sight, and frequently they carried responsibility for their families. This group of people needed to be equipped with those skills which are essential for them to continue the life they had led before. This group gave rise to mobility instruction. People became concerned with their adjustment, with their rehabilitation, and soon found out that without giving them mobility, and without instructing them in the essentials of good posture to be established or retained, these people would not be able to re-integrate into the lives which they had led before. This gave rise to a formalization of mobility efforts, techniques, and a philosophy which are still guiding us, not exactly in the same way in which they were conceived, but with some modifications. I hope that these modifications will continue because without them, mobility instruction would be a dead issue. Institutes like this one are valuable milestones in evaluating and in moving mobility on. The exchange of thoughts and experiences among people who are concerned with the teaching of mobility is the best safeguard against what I would call petrification of mobility which is certainly not a technique or a teaching skill that can be fixed on any stage of its still young development.

The blind have moved on in society from the stage when they were considered separated from society, then were treated as society's wards, and when, through the efforts of the blind themselves, we find ourselves in the era of their integration into society. Only now is mobility actually considered a condition "sine qua non" -- something without which we just cannot do.

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POSTURAL THERAPY FOR THE BLIND

By

Myrna Turner, R. P. T. *

For a blind individual to achieve effective mobility it is necessary , first of all, that he have good posture and balance. In addition, it is important that his concepts of body image and basic orientation in space be adequate and accurate. It is primarily within these areas that physical therapy can contribute to the mobility training of the blind.

First, some form of evaluation is necessary, then physical therapy techniques designed to develop good posture and sensory awareness, utilizing only non-visual cues or aids, may be instituted. This paper will discuss briefly some of the physical therapy techniques presently in use and under investigation at the Illinois Visually Handicapped Institute.

The form currently being used for physical therapy evaluation covers four basic areas: 1) physical characteristics and abilities; 2) gait; 3) body image; and 4) orientation.

The physical evaluation includes noting all physical or postural defects such as head drop, abdominal protuberance, lordosis, or scoliosis. Then through manual muscle testing, examination of joint range of motion, and muscle length tests, any weakness or limitation of motion is discovered. During these examinations the student's state of tenseness or relaxation is also recorded and his coordination and balance tested.

Secondly, the student's gait is observed. Is it the wide-based out-toeing gait so often seen in blind individuals? Is it a hesitant and shuffling or a propulsive and unsteady gait? Does the student veer consistently to one side; if so, how much? These and any other gait problems are noted.

Thirdly, an attempt is made to determine the student's concept of body image (the mental picture he has of himself). This is done primarily through questioning the individual concerning relationships of various parts of the body, verbal description of a body part, and ability to perform accurate joint motions in response to simple commands.

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A test of the student's ability to execute accurate turns is also made. Finally, to assess the student's ability to acquaint and orientate himself in strange surroundings, he is asked to do such things as point out the door he used to enter the room or to find something located on a particular wall in the room. How many attempts and how much additional assistance he requires to perform the activity is observed and recorded.

With the exception perhaps of the testing for muscle strength and length, this evaluation is a subjective and rather superficial one. It does not attempt to pinpoint very precise and detailed problems, but rather to establish broad and basic areas of difficulty which may then be approached not only by physical therapy but also various other related disciplines. Later more specific postural problems will be examined and dealt with.

In order to have some means of measuring a student's ability and progress the student is rated on a 1-5 scale following the first evaluation and at intervals during treatment. This scale is based on a combination of the student's abilities in the five areas of 1) postural defects; 2) muscle strength and length; 3) gait; 4) balance; and 5) concepts of body image and orientation.

Once the student's evaluation is completed a suitable treatment and training program is instituted. Initially, a general exercise program intended to provide adequate muscular ability, promote relaxation and improve coordination is set up according to the needs of each individual and carried on daily in class under the supervision of the Institute's physical education department.

Muscle strength and length. A few of the most common areas of muscle weakness and limitation of motion and exercises used to correct them are the following:

1. Abdominal weakness
 - a. Sit-ups
 - b. Single and double straight leg raising (supine)
2. Tight hamstrings (long muscles behind legs)
 - a. Touching toes (sitting with legs extended)

3. Lordosis (arched low back)
 - a. Pelvic tilt (supine, flattening back against floor.
 - b. Alternate knee to chest (supine)
 - c. Both knees to chest (supine)
4. Round shoulders
 - a. Back extension (prone)
 1. Raising head and shoulders with hands behind back
 2. Raising head, arms, and shoulders with arms extended over head
5. Head drop
 - a. Neck extension (prone with head extended over edge of table, raising head against manual resistance placed at back of head)

Relaxation. To help reduce tenseness and rigidity, especially of the upper extremities, the student begins by learning voluntary contraction and relaxation of large muscle groups in connection with breathing. Then as he learns to recognize relaxation he proceeds to isolated and reciprocal motions which call for contracting one part while maintaining relaxation in the rest of the limb or body.

Coordination. Difficulty in the area of Coordination is very often a problem in the blind individual. Since one of the reasons for this may be the lack of as much opportunity to participate in the kinds of activities which promote natural development of coordination in the sighted child, some time is devoted to such things as rolling, crawling, and balancing on all fours. And as an aid to improve basic coordination and development the use of the Exer-Cor (Exercise for Coordination)¹ machine designed specifically for cross-patterned creeping exercises was recently begun. The student assumes a crawling position, placing his hands and knees on four small pads which are on tracks, and learns to pattern, incorporating head movement with the arms and legs. Because of the construction of the machine, the student uses his own muscle power but is able to move only in the desired pattern. If necessary, straps, etc. are available to help hold the hands and legs in place, and it is possible for an instructor to station himself behind or in front of the student for assistance in the beginning. However, one of the advantages of this machine is that the student may do a considerable amount of

patterning and yet remain in one place, thus obviating the need for large areas of space and constant supervision.

To improve strength and coordination of the hands, a major problem, the students are taught reciprocal hand movements such as alternate opening and closing of fists. They also work at the hand activities table which, by use of a series of pulleys and weights, provides resistive exercises to even the smallest muscles in the hands and fingers. In addition, exercise putty, various types of grippers, wrist and finger rollers, and other exercise devices are used.

Specific conventional exercise programs are also provided when necessitated by additional diagnoses such as scoliosis, residuals of polio, or cerebral palsy.

Postural Training. Once the general exercise program is well under way, the next step is actual postural training. For this purpose success has been gained with a group of exercises² adapted from ones previously used for patients with low back pain and weakness.³ These exercises are based on a reduction of the curve in the lower back which is accomplished by contracting the abdominal muscles and gluteals, resulting in a flat back. Students learn not only to perform this as an isolated activity but to maintain it while performing other motions and in connection with breathing, again promoting relaxation.

These exercises are usually taught to a group of five or six students at one time, not only to permit reaching more individuals in a short time, but also because the atmosphere of the group lends itself to an increased amount of discussion and experimentation and, therefore, a more meaningful learning experience. Since control of trunk muscles plays an important role in balance, the postural exercises lead into this area as well.

Gait Training. Another phase in postural rehabilitation is the correction of faulty walking habits. This involves a variety of techniques for training of heel-toe gait, maintaining a stable, narrow base of support, elimination of out-toeing or head drop, maintaining relaxed upper extremities, and improvement in tracking.² Most of these defects can be approached much as they would be in a sighted individual. However, there are also some non-visual aids which may be used to assist in such gait training.

The treadmill is useful for teaching heel-toe gait because it is practically impossible to operate the treadmill in any other manner. The narrow width of the treadmill belt also limits the base of support.

Another device used to teach correct positioning of the feet is the slantboard or inversion board. The student walks along the sloping board keeping his toes pointed inward touching the raised center strip, thus discouraging out-toeing.

Occasionally a soft cervical collar may be used as a temporary reminder to discourage head tilt or drop. It is important to note that this is only a temporary measure designed to draw the student's attention to a postural defect he cannot see.

To help promote a more natural relaxed arm swing during gait, the crook of a long cane may be placed in each of the student's hands. The therapist then grasps the opposite ends of the canes and walks in tandem with the student, projecting his arm swing to the student as they walk.

Weighted wristlets on the contralateral arm are also used at times to correct excessive veering in gait.⁴

In the last two areas of the physical therapy training program, body image and orientation training, the techniques used must of necessity be newer and more unique than any others discussed. It is here the blind individual needs a great amount of special help if he is to develop a sound mental picture of himself, the world around him, and the relationships between the two. At the Institute we are currently experimenting with several techniques developed for this purpose.

Body Image. One of the greatest assists in teaching the concepts of body image has been the full-sized, articulated mannequin. With the mannequin students are able to use their tactile sense to explore and learn something about the human body and the relationships of its parts. The students use the mannequin first in a program of exploration and discovery. Later through questions, demonstrations, trial and error, and imitation they begin to actually learn not only what their own body looks like but how, where, and why it moves as it does.

Hopefully, in the future, someone will design a life-size figure which will be even more realistic in regard to texture, temperature, joint structure, etc.--perhaps a figure of the type now used in some medical and nursing schools for training in anaesthesiology and artificial respiration. But even a store window mannequin does provide a beginning, and the student must start somewhere.

Orientation. To aid orientation the individual is first related to a fixed object such as a wall. Against the wall he is taught to perform joint

motions such as shoulder flexion and abduction and hip abduction and rotation, stressing accuracy. Instruction in making accurate turns is also begun against a wall using the relationship of the body to the wall to determine 90° , 180° , and 360° turns. Because of the importance of accurate turns in mobility, the 90° turn is stressed. For this purpose two walls may also be used, teaching a concept of placing the entire back of the body against the wall being trailed by the hand or cane in order to make an exact 90° turn.

Later less fixed clues are sought, such as the resistance of the body to wind. If one recalls the struggle necessary to walk against a strong wind, it becomes apparent how much awareness of one's body parts this wind imparts. To gain this effect, a floor fan on a relatively tall base and two portable walls are used to form a sort of wind tunnel. Again, joint motions and turns are taught, using wind resistance on a particular body part or surface to determine accuracy. Initially, the fan's highest speed is used and then reduced as the student improves. Eventually, of course, the student must proceed to similar activities without any aid.

In order to better utilize the student's sense of touch in orientation training a means was sought which would shrink his surroundings, so to speak, to a point where he would be able to come in physical contact with a larger area at one time. For this purpose a tunnel was devised. The carpeted wooden tunnel is three feet square, with three straight sections, each nine feet long and two corner sections. This type of construction allows the therapist to arrange the tunnel in several shapes. The students again use the tunnel in groups. They are told nothing except that they will be crawling through a structure which is completely safe. They are asked to go through it silently and to gather as much information as possible about it. Each student is individually shown the entrance to the tunnel, then placed on his knees and allowed to make his way through it at his own pace. Later, after all have emerged, the group sits down to decide what the object is, what it is made of, how large, what shape, how many parts, corners, etc. There is usually considerable response and enthusiastic discussion among the students as they attempt to formulate a picture of the tunnel in their minds and then to relate some of the ideas and concepts learned to everyday objects and experiences. Later those individuals who had judged incorrectly or had difficulty grasping some concepts are taken back to the tunnel and given a chance, with assistance if necessary, to understand or learn the correct answers. The shape of the tunnel may then be changed and the group allowed to try again. This activity has proved useful not only for the student's learning program, but

has also served to alert the therapist to specific concepts which the students lack or find difficult to grasp.

This is but a brief description of a few methods being used in an attempt to teach body concepts. As mentioned earlier, physical therapy is obviously not the only department working with these problems. There are many areas where such training overlaps. Physical therapy does, however, have an opportunity and an obligation as a profession to contribute its share. For without physical readiness and accurate body concepts it is unfair to expect a blind student to be able to take full advantage of conventional mobility training. But with the development and use of such techniques as those discussed here, along with the work of other fields, we can hope to give the blind adequate preparation for the infinitely more complicated task of learning to move independently through the complex and busy world in which we live.

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CREATIVITY IN MOBILITY

By

Donald Blasch *

Nowhere in the field of rehabilitation or habilitation is there more need for creativity than in the field of orientation and mobility for the visually handicapped. Nowhere else do we encounter so great a variety of individual differences which must be considered to establish an effective program in this area. Seldom do we encounter a client or student whose only problem is "blindness". An ever-increasing number are multi-handicapped, and recent figures estimate that they number over 60% of our blind population. Our past rubella epidemic will soon--if not already--have us working with an influx of children who are multi-handicapped. Fortunately, only about 20% of these children have visual problems, but invariably when a cluster of handicaps includes visual impairment, it is usually considered the primary disability.

In addition to the great variances in general physical condition, intelligence, motivation, personality make-up and previous background, there is wide variance in residual vision which must be taken into consideration in tailor-making a mobility program for the individual. I believe the estimate that over 80% of our blind population retain some useful vision is correct. Now with all these factors to be considered, it is small wonder that creativity has to be an essential part of the mobility instructor's make-up.

Former Secretary of H. E. W., Garner, when talking to his staff about the recent reorganization of H. E. W., aptly stated it by saying, "Your sole charge from me is to develop policies and programs that are innovative and experimental--all of them aimed at finding ways of delivering services more effectively, more efficiently and more quickly to all the children, youth and aged that require them." I am sure that this charge is equally true of all people working in the area of mobility.

Today we are faced with rapid changes in our social and technological world. It has, for example, been estimated that 60% of what an engineer learns in his undergraduate studies is obsolete before he graduates (Purdue Study). This percent may not be true of those who have completed training in Orientation and Mobility, but certainly we have witnessed changes of a technological nature with which we should be concerned, and be devising methods and means of incorporating what is useful to our

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clients into the mobility program. We have for years been asking for a good collapsible cane--one that functionally approached the one-piece cane now in use. This year four such canes appeared from I. I. T., M. I. T., Wayne Noble, and Minneapolis Society for the Blind. All are superior to previous models. Now, hopefully, the mobility instructors will field test and evaluate the devices and incorporate the desirable features into the program, using ingenuity and creative abilities in the process. The same applies to the Kay device and the three beam Laser cane. I cannot stress too strongly that a good, creative mobility instructor must be familiar with all new developments of technology in his area and discriminate between the limitations and the assets. This does not come only by reading the literature--it requires experimentation.

Then we also have Dr. DelCampo's "Amauroscope". Superficial reading of the literature would lead one to believe that this will solve all mobility problems encountered by the visually handicapped--that science and technology have produced substitute vision. Closer observation and demonstration counteract this, and yet there may be something here which bears further investigation. Technology has not as yet reached this goal. (This brings to mind the story of the Englishman who came to this country to study our intensely technological society. One day he spent the entire time with the I. B. M. Company. From the beginning to the end of his visit all he saw was room after room of countless machines--with blinking lights, disgorging coded data at the press of magic buttons, attended by only one or two human beings. At the end of the day, dizzy with the mechanical nature of everything, he got on the elevator to go down to say farewell to the management. The elevator was crowded. All occupants were men except for one good looking, shapely young woman at the rear of the elevator. The Englishman stood at the front facing the door. As the elevator descended, all was quiet until suddenly the silence was pierced with a scream from the woman. Without turning around, the Englishman was overheard to say: "Thank God, there are still some things they do by hand.")

Now let us turn our attention to the field of psychology and how it can help us to create more effective programs. I wish primarily to investigate how the Operant Conditioners--Behavior Modifiers or Individual Organism Researchers can be of help to us. Empirical evidence substantiates the theoretical consideration that the single most significant problem facing the rehabilitation worker (mobility instructor) concerns the ways and means of implementing marginal motivation. To a behavioral point of view, such marginal motivation seems merely to be a case of insufficient or poorly arranged reinforcements. The basic question is, "what does the client get out of his activity?" Then the

problem of motivation is essentially a simple one--one must merely arrange the environment so that its desirable features are only available upon his participation and accomplishment in the rehabilitation activity. It is here that the Operant Conditioners will make their greatest impact.

The reinforcers which you have available are your attention and approval and the stimuli arising from the training activity itself which indicate improving ability or skill. Social approval and attention of the mobility instructor is a good reinforcer, mainly because it relates to the instructor's position in the authority structure of the Rehabilitation Center or social institution dealing with the client. It is important that the mobility instructor have a considerable amount of autonomy and authority--any emphasis on his subordinate position will render his approval less effective.

Too often we have the tendency to show an interest in the client who is not performing--trying to get him to perform--and when he starts, we pay little attention to him, ending up with exactly the reverse effect. A creative mobility instructor will devise ways to keep his client informed of his progress--often it is not noticeable on a day-to-day basis. He can use rest and activities as rewards, along with change in environment. A creative mobility instructor can survey all the client's activities with the explicit application of programming technology as a means of task analysis and presentation, with more use of reinforcing and punishing consequences.

Another area that could use a great deal of creativity is the work with clients with residual vision. Many of you know that often the diagnosis has had more significance than measurements of visual acuity--but what we really need is the measurements of the clients' functional visual ability. Mobility instructors have never completely utilized the remaining vision, and have emphasized only the remaining senses when dealing with the problems of the adult adventitiously blinded clients. In other words, the vast majority of persons considered legally blind have received services which are essentially those developed for totally blind persons. It is clear that the problems facing the legally blind person with partial vision are extremely complex and may involve different methods of rehabilitation than we generally use today.

At the present time we are in need of a test to measure the individual's functional vision. It does not appear that we will get much help from ophthalmologists or optometrists in this area so it behooves

us to develop our own tests--and I am sure many of you do in a very informal way. Further, there have been no organized attempts to train the individual to use his vision more effectively, other than by the use of optical aids. Yet Dr. Barraga has demonstrated that it is possible to increase visual efficiency in congenitally blind children without any significant change in near vision recordings. This was done primarily with emphasis in their academic progress--reading the printed record.

Dr. Hoover has constantly stressed the fact that our standard method of determining legal blindness is antiquated, unrealistic and prejudicial. He points out that only two of several visual characteristics are considered--distance visual acuity and fields--and that even these two are not really standardized because of lack of uniformity of distances, light contrast charts, and targets found in each testing situation. So it is little wonder that we see individuals with exactly the same recordings, functioning on vastly different levels. A good functional test would be of infinitely more help in planning a suitable and realistic rehabilitation program for the client.

I am sure that we all are aware that the eye receives many more stimuli than it uses. Where the selectivity takes place--in the retina or different portions of the brain--is still not clear. However, we do have enough experimental data (Smith-Snyder-Pronko-Stratton-Kohler-Gregory-Gibson, etc.) to clearly indicate that the human perceptual system is very flexible and able to adapt to new conditions, and that learning is a factor in the adaptations. It appears that these adaptations are an overlying of earlier perceptual interpretations, so we can relearn visual habits, and, to me, this would appear to be vitally important to the adventitiously blinded person who retained partial sight. Perhaps I am a little biased in this area, but it certainly appears to me that we have barely scratched the surface, and anyone with a little ingenuity and creativity can have a field day here.

Let us now turn our attention to the largest segment of our blind population, but the one that we tend to shy away from or only engage in half-heartedly--the aged blind. Last year at a meeting at M. I. T., I attempted to point out that we were accused of directing 90% of our services to one-third of our blind population. If there was any truth to this claim, most of it must come from our neglect of the aged blind. There are over 19½ million people over the age of 65 in our country. Incidence of visual impairment among the aged is much greater, and those over the age of 65 represent at least 50% of our blind population, yet they receive probably less than 10% of the services offered. I am aware that over 40% of the graduates of

orientation and mobility programs work almost exclusively with blind children in academic settings and they represent less than 10% of our blind population.

Relatively little has been done in the area of orientation and mobility with this group, but in the few cases where efforts have been made in this area the results have been gratifying. The goals, of necessity, are more limited and the progress is slow; the aging processes negate the chances of maintaining a constant level of performance. However, effective training will help them to better maintain their self-esteem by increasing personal and physical independence and allow them to operate more effectively in their chosen environment.

Now let us see where creativity can play an important part in devising a program for this group. In addition to diminishing vision, we have the following physiological factors to consider: 1) diminished hearing, 2) diminished pain sensitivity, 3) diminished sense of balance, 4) diminished ability to adapt to changes in temperature, 5) diminished perception of movement of body, 6) decline in muscular strength, 7) decline in cell growth and repair, 8) decline in capacity for continuous exertion, 9) decline in information gathering and interpreting functions, 10) decline in ability to perform tasks requiring sensory motor integration, memory, discrimination, decision making and attention span.

The lack of motivation is another factor that must be considered. Aged people are approaching the end of the continuum of the life cycle, and it is more difficult to instill motivation in this type of client. I would be exceedingly interested to see what success the operant conditioners have with this group of clients. But, in spite of this, the ability to learn continues, although at a much slower pace. Aids which present stimuli too quickly or require rapid responses, or aids that are unfamiliar, have less chance of succeeding with this group. They should not be ruled out, however, as we still have a wide range of individual difference. There certainly is a tremendous need for creativity in this area.

The offering of mobility instruction to the younger child is of extreme importance because movement is fundamental to all learning. For a child who has no sight, movement to the object is essential in order to allow the taking in of information through physical contact.

Movement outward is essential also for the purpose of making social contact. At this level formalized and systematic assistance in orientation and mobility is imperative to build for overall potential adjustment at the appropriate time. It will need to be consistent with the physical and emotional level of the child, as well as incorporating all activities that are necessary to acquire the cooperation of the parents. Many of you who are already working with blind children are aware that the building of experiences and concepts that correlate with the reality of the environment are necessary to initiate corrective exercises to improve gait, posture and body concepts. All of this requires ingenuity and creativity on the part of the instructor, and the ability to secure the cooperation of all the people involved with the student or client.

I have mentioned a few areas where there is a tremendous need for creativity on the part of the blind rehabilitation specialist--I am sure that there are many others. Basically, when we consider the need for creativity we can view it from two standpoints--first, from the point of view of difference of age, degree of sight, experience, goals, and general physical condition, also, the psychological and emotional condition of the person. Second, from the standpoint of the "management" of the mobility in terms of a preferred educational philosophy.

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SENSORY AWARENESS TECHNIQUES WITH GROUPS OF BLIND ADOLESCENTS

THE "HAPPENING" AT IVHI

Al Manaster *

Mrs. Judith Adams **

In our work with the visually handicapped, we have noted that the congenitally blind often have a great deal of difficulty in developing basic body concepts/self awareness. We find that they are often very stiff, rigid, frightened and unable to make use of their potentialities. Oft times, they are unable to ascertain where they are in relation to others or in space, where their hands, head, body, etc., are in relation to the rest of themselves. They are unable to make adequate use of haptic cues, use their hands effectively or learn many basic skills. In some cases, basic and elemental concepts such as which is the left hand and which is the right must first be taught to some of these persons. We find many youngsters who walk flat footed, unaware of the idea of lifting their feet when they walk or run, with many mannerisms and so-called "blindisms", such as rocking, rubbing of the eyes, aimless fluttering of the hands, etc. We find them unable to perform simple functions such as tying their own shoes, buttoning their own shirts, eating with a knife and fork. However, many are quite capable of playing the piano, accordion, guitar and show good to superior verbal abilities. It has been pointed out in a recent study in France that the visually handicapped or blind youngster is often far ahead of sighted youngsters in verbal concepts but when it comes to actual experiential concepts or physical knowledge they fall further and further behind their sighted contemporaries as they grow older.

It is our opinion that much of this is due to experiential lacks, that many of these youngsters have not been allowed to try things, to creep or crawl or experience the various activities that are commonplace for the sighted. Too often they are overprotected, with many taboos (don't touch) placed upon what the blind child is allowed to do and often their training, education, and general up-bringing is colored by societal prejudices about what the blind can or cannot do.

In the summer of 1967, on an experimental basis, we held two sessions in which use was made of some of the techniques and ideas which are being found in the area of sensory awareness (Selver, Spolin, Gunther, Schutz). We found the youngsters who took part in some of the movements and experiences such as pounding, falling back,

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moulding one another as statues, falling limply to a mat, etc., enjoyed it, expressed joy and surprise at the freedom they felt and wanted more. It was felt these results were promising enough for us to make an attempt at the same program in 1968, but on a more organized basis. The entire program was filmed and has been edited into a shorter film. This paper is an attempt to fill in and further explain what was done.

We had a total of five sessions in which we attempted to start with more basic concepts and ideas and as the sessions went along, make them more complex and more directly applicable to some of the activities children engage in.

Each summer at IVHI, there is a six-week summer mobility program for young adolescents, ranging in age from twelve to fifteen. Attempts are made to work with the children in areas of mobility, ADL (such as cooking, washing clothes, buttoning clothes, etc.) and some physical education, crafts and a few other areas of instruction and experience. The "sensory awareness group" was scheduled for Monday evenings from six to eight p.m. It was specifically held in the evening and not during the day so that the children would have had a chance to relax after a full day of class, (and the staff a chance to catch their breath) e.g., so that everyone would be able to walk into the "Happening" (as we called it) free of some of the tensions which accrue during the day. The children were free to come or not as they wished, although we strongly encouraged them to try it out. We developed a basic outline of what was going to be done. A week prior to the onset of the program, the members of the staff who were going to take part met for an evening and went through the various exercises or experiences themselves, both with and without blindfolds on. We discussed how it felt ourselves, made adaptations and changes as we went along and tried to get some idea of what was going on and, perhaps, how this might effect the others.

During the following week, we told the youngsters about the "Happening" which was going to occur on July 1, 1968, and told them some of the things that were going to take place.

In the first session, we had all the youngsters walk into the "Happening" room and take off their shoes. Then we asked them to walk around on the mats, hanging limply, having their arms swing free, and bump into each other. We suggested just to walk and not to try to direct themselves but feel how their legs move, their arms move, and how they felt when they bumped into someone. Also to try to become aware of the differences in the various people they were bumping into--

some were tall, short, fat, and so on. As they were walking around like this, staff would walk along with them, suggesting they figure out how it felt "walking through the air", how the air felt bouncing off them, how the mat felt underneath them. We then suggested they try to walk very slow and "push against the air" and try to make believe they were walking thru glue or something very sticky. Those children who were not able to get the idea we would model or manipulate by holding their arms or legs, forcing them to walk very slowly, showing them how to push hard and allowing them to feel our own bodies or muscles as they moved. After a while we suggested they move limp again and then let themselves fall to the mat and bounce. The code name for this became "flop". It is interesting to note that in these early sessions, many of the youngsters did not fall or "flop" but would gingerly let themselves down to the mats.

In between each exercise we had the kids sit in groups with various staff members and discuss how they felt while they were doing their various things. In other words, we were trying to give them not only the experiential but also a cognitive input, trying to get them to relate this to other activities in everyday life.

After discussing the "walk around" we gave the following instructions: "Make believe you are in a box, scrunch up real tight while you are squatting down--now make believe that the top is on real tight and pushing down on you, the sides are pushing in and you want to get out. Now push up real slow and hard, making the muscles of your arms and legs work. Remember, the top is pushing down hard and you have to push up real hard, push all the way up, etc."

Many kids would just stand straight up, not understanding what was meant by a box pushing down or pushing up or out. In these cases, staff would apply resistance or pressure to the child by pushing down at him, holding him or showing him how to raise his arms or his legs. They would allow the kids to again feel their own bodies, arms, legs, as they moved, in other words, modeling for them.

We tried to get some of the youngsters to help each other, i.e., those who had done the "push-up" rather well would help one of the other youngsters do it. Many of the children put in quite a bit of effort and began to get some idea of how their arms and legs moved. After this, the instruction again was "flop", at which point we discussed how it felt. Many kids said that they hadn't realized that their arms and legs had to move together, how much strain there was on the back or that they had to push with their legs also and so on. During this "flop" we had the children feel not only themselves but others to find out where the body parts were and how anybody else's arms or legs moved, e.g., modeling for each other. We also had the kids bounce up and down or

shake themselves up to see how their whole body moved.

Thus, the idea was to get them to become more aware through these two exercises of how they felt and how their body moves.

We noted that many of the congenitally blind youngsters do not know how they look. When they think they are smiling, they look as though they are grimacing, when they are sad they look as though they are smiling and so on. Many times a congenitally blind youngster walks around with a "what, me worry" grin on his face, not aware of the fact that he is not conveying his inner feelings to the sighted world. He may have been told he must grin or smile but doesn't know what a grin, smile, laugh, frown, etc. is. To try to handle this sort of problem we offered the following: "What do you look like to other people when you are happy or sad (etc.)? Sometimes our bodies and faces say things we don't mean them to, like we feel happy but look sad, and so on. Wonder how you look when you feel sad or happy, do you look happy? What does happy feel like? How does it feel like in your arms, legs or shoulders? Let's try it. Let's walk around like you are very happy -- make believe you are happy. Life your arms, head, neck; walk around happy with your entire body. Try to find out what your knees are doing, your elbows, your feet. How about the inside of you, can you feel happy inside?"

We asked the children to feel each other's face muscles or the staff's faces, to chew vigorously, smile and feel how their own faces moved and then how other's faces moved. We manipulated the face muscles or had the children manipulate each other's faces as well as their own to get some idea what was going on. This was done in each session with various feelings. (Anger, surprise, sorrow, etc.) In the first session we did this with "happy" and "sad" and after the "flop" had the group discuss how it felt and to compare the feelings.

As the last part of this first "Happening", we broke the youngsters up into two groups, had them get into two separate circles and asked one person to volunteer for each group. The following instructions were given. "Can you bend or bend someone else? How does it feel when we bend or push you around or do things to you? Can you move each other around? We would like to have the volunteer just let himself relax at the beginning and just let people push him around and treat him like a statue. As those who are doing the pushing or shaping, hand (volunteer) around, tell aloud how you are moving the person and who you are going to hand him to. Tell exactly what you are doing. Everyone in the circle get in close and call off your names so we know where everyone is."

This was done for two purposes. One was to get some idea of how the human body moves; that there are many variations to movements and that there is a wide range of activities, actions, positions one can take. The person is not frozen into one specific way of standing, moving, etc. The other was to get some idea of where one is in relation to another, that is, to know who is across from you, who is to the side, etc. A further attempt was to have the youngsters begin to get some idea of what they were doing, which was the reason for having them verbally state what they were doing. In this way the others could copy and work from there. The person who was the "statue" would also state what was happening to him or her; in this way the "statue maker" received feedback as to how it felt. This was done with several of the youngsters and it was found that the children became quite adventuresome in manipulating another individual, moving the arms, body, legs, etc., around and helping one another in moulding. Then "flop" again and discussion of how it felt to be moulded, to do the moulding, and what had happened. Body parts were compared and discussed as to how they can move. This was related to walking, dancing, sports, etc.

During each "flop", as the youngsters sat around and talked, the staff would have them try different ways of sitting. Their arms and legs out, bent, crossed, to the side, etc., and to discuss how they felt as they were sitting.

The second session was on July 8, 1968. In this session the majority of the youngsters that were in the first session returned. Some had stated that they wouldn't have any part of this because it was foolish. While we asked them to join us, we didn't attempt to force them.

We opened up again with a "walk around", only this time with music in the background. We had drum music, East Indian music, Beatles, etc. After the youngsters "flopped" and discussed how they had felt when they moved around, they began to discuss how they felt falling with the "flop". This led to use of the "fall back" (Schutz). Many youngsters said they had a strong fear of falling. We tried to show them how to become very rigid and stiff and then to fall straight back into someone's arms. Many of the kids had a great deal of difficulty in making themselves stiff or rigid and several were totally unable to get the concept of having enough control over their own body to make themselves stiff. Others were very frightened. What was most gratifying, however, was that quite a few of the youngsters, especially several of the girls, after trying it once or twice, really began to enjoy it and kept asking to "fall back". Surprisingly, these were children who were very frightened of falling and had expressed the greatest fear over possibly being hurt. This was much as

what had happened in the sessions of 1967, i.e., several young girls who had been very fearful of falling or hurting themselves and quite timid in general, found that the "fall back" was one of the most exhilarating experiences they had ever had.

We made use of the "fall back" for several purposes. One was to help develop enough conscious body control to be able to stiffen the muscles of the body. This is something many of the youngsters were quite unable to do. Another was to realize that you can fall and still not hurt yourself. This fear seems to have been heavily ingrained by the parents into these children. The sensation of falling through the air and then discussing how it felt to lose one's balance and what balance actually was. It has been noted of many of the congenitally blind that they have very poor balance, leading, partially, to their very clumsy and awkward method of walking.

After the "fall backs" we had the youngsters "flop" again and discuss how this felt and how it was related to flopping, walking, and pertaining to balance.

After the "fall back" we went into a game called "I See a Ghost". This is a children's game which is similar to the game of "Telephone" in which each person in line touches the same body part on the next person. They must state what part they are touching. Thus, a person starting the line would touch a second person's nose stating "I am touching the nose", the second person would touch the third person's nose and so on down the line. Each person would keep their hand on this body part. Then the one at the other end of the line would start back, touching another part of the body (for example the ear) and continuing. However, the hand would not be taken off the first part of the body. Thus after they had gone back and forth once, you would have a person touching the other person's nose and ear. The purpose of this was to get some idea across to the children that body parts are the same on each person, in the same place, and in relationship. The kids stood shoulder to shoulder and this helped give some idea of spatial relationships. After going through this several times and after the "flop", the youngsters discussed what they had done. They stated that they were interested in where the body parts were. During the discussion they continued to relate their own face to another's face, legs, arms, etc. What came forth strongly was the surprise at the freedom to touch. In the past, they had been afraid to touch or investigate and had many misconceptions. They thoroughly enjoyed the freedom to be able to touch another person without fear of retribution or of doing something "wrong". The youngsters seemed to thoroughly enjoy this experiment and discussed

it quite a bit, while modeling for one another how the body moved, the face felt, and showing one another what to do.

After this we went into a tug of war with a rope to give the groups some idea of how to pull and use their strength in a group. We found in 1967 that often a youngster would pull the opposite to the rest, or at right angles to one another, not having the idea of pulling in a line and together. We found this to be true this time also. The youngsters threw themselves into the tug of war with gusto and really fought hard. Even the staff became caught up in the spirit and began to root for their "teams" to the extent of pulling along, trying to get their side to "win". It was informative to watch the feet of the children; many times their bodies would move one way and their feet another. We discussed this with the kids and tried to help by modeling and moving them. We went back to the "tug of war" but this time untied the two ropes. As the kids pulled, we let the ropes part so the kids fell in a heap. This was to lead into the concepts of "surprise" and "fear". They discussed how it felt to be afraid and surprised, again moulding and modeling the faces to give the idea of how they looked. There was a good deal of discussion on how they felt about falling, which was related to how they felt during the "fall backs". Many asked to try the "fall back" again at this point to see what the differences were between falls when you expect it and falling unexpectedly. The discussion became rather heated with some of the youngsters saying they didn't like the idea of being tricked like that. After this we asked: "can you imitate or be something else? How can you change yourself around. Sometimes it's fun to make believe or think of being something else. I'd like one of you to be something, only you have to tell everyone what you are, what you are doing and how you are moving and so on. I want you to be something that does something like a bike or a train or machine or typewriter or airplane or something like that. But you have to do just like it and then you have to tell everybody exactly what you are doing and how you are doing it so they can learn how to do it from you".

We had the kids break up into two groups and one volunteered to "be something". One boy was an airplane landing. He told what he was doing while flapping his arms up and down and then fell directly to the mat. The others then tried to imitate his actions from his verbal description. We had them help each other out. That is, the person who was "object" would go around and see (feel) whether the others were shaping themselves correctly. One youngster put his foot behind his head (he was double jointed) and the others nearly broke their backs trying to imitate him. (Most eventually did however!). In some instances one youngster would describe what he had done, was doing or how he was shaped, a second youngster would try to imitate it from his verbal description and then a third would go over to the second and from her description and feeling how she had shaped herself would try to model herself in the same way ("Third generation" imitation). One of the

things that was imitated was the growing of a flower. In 1967, we were quite surprised when one totally blind youngster stated that he was going to be a flower, then proceeded to imitate a flower growing, reaching the top, and then dying. It must be noted that he did a beautiful job of imitating a flower and that from his description several others did very poetic and graceful imitations. We found the same thing happening this time, i. e., that when they imitated one another they were often much more graceful than one would expect from watching them in walking around during the day. We suggested to the kids that they be creative and be something different or unique; to use their imagination and go "way out". This began to occur as they became statues, horses, growing plants or pieces of machinery, etc. The purpose here was to see if they could make use of verbal description to manipulate or change themselves. All too often we find people describing things to the visually handicapped individual who may have no concepts or reference points. We found this to be true with several of the kids, but we also found that once they were shown what and how, many began to develop the concepts quite rapidly. Not only for themselves, but to pass the ideas on to others. The idea here was that one way to learn is by teaching and we found that this seemed to hold true here. We also had staff members manipulate the youngsters, or model for the kids. By the time this session was over, the kids were showing a better grasp of many concepts they had had great difficulty with at first. They also began to show more awareness of themselves.

Throughout the session, one thing was quite evident--the kids were enjoying themselves, had a lot of fun and were doing things they had wanted to do but had not the opportunity before.

The third session (July 15, 1968) again started with a "walk around"--only this time with music. We played "Scherazade" (the storm) and had the kids move in time with the music, move their arms and legs in time with the music. We manipulated them, asked them to jump and move around and "let loose". Then "flop" and discussion of anger and how a person feels when angry. At this point it was suggested they might like to "pound" (Shutz). While pounding is often used as a way of expressing anger, we were also trying to get them to feel how their arms and legs move and how they could put themselves into something totally. We found some of the kids hit the mat lightly while others began to throw themselves into it and pound with their full body force. For some of the kids it was quite a frightening experience as they began to realize that they could get angry. For example, in 1967, when we did this, one girl after really ripping into the mat, stated that she "never realized that she could get so mad at something and this scared her". We talked about feelings, mad and angry, and how it felt to pound and hit something. We tried to show some of the kids who had been barely tapping the mat how to hit and to move arms alternately. Some of the youngsters were very badly uncoordinated and we showed them how to get a rhythm into their pounding and how to put themselves into their pounding. We suggested to them

that as in pounding, it is true of almost anything, that when you do something you put all of yourself into it and not just a part. Several kids who "pounded" and really enjoyed it afterwards said they felt very relieved, that they had fun, and that they had more of an idea how it felt to be angry. Also they didn't have to fear "losing control".

We had the kids get into 2 circles, gave each group a soft ball, then pass the ball around, to one another, first passing it around in front of them, around the back, always from one hand to the other. In 1967 we noticed great difficulty in getting the hands to meet over the heads in learning how to pivot or swing, how to keep an arm straight, or awareness of where in space the next person was. This was seen with this group. We helped them hand from one hand to another, straightening arms, pivoting, i.e. being able to control their own movements consciously. Some of the kids had immense difficulty in getting these ideas and would move their arms rather aimlessly. In trying to teach congenitally blind youngsters how to swim, one of our staff members stated that they often did not know what front, back, up or down meant. Instead, their arms would go out at various angles.

We had them pivot and put their entire body into passing the ball, doing this regularly and in extreme slow motion. This was to get the feel of where their arm was at any given time, and what was happening.

Throughout this entire program, we attempted to put as much cognitive input and verbal feedback as possible to help the youngsters further understand what was going on. One aspect of handing the ball around was the use of these motions in bowling, dancing, balance, etc.

After "flop" and discussion, we went into "sculptor". This was similar to the first session where we had the groups molding one another into statues. Here we broke the group into triads (with two quartets) and had two of the children mould the third. They were to describe, what was being done and to make a joint decision as to how they would move and what they would do with the person. Each individual in the triad had a chance to be a "statue" and a "sculptor". We suggested "sculptors" "make something which was familiar to them", that is, something with which they had had some contact so they could fully describe it. One staff member was in each group working as a "spotter" to help the kids become aware when the "statue" was off balance or help with feedback. It was heartening to see many of the children who had had great difficulty in the first session and in passing the ball were better able to mould one another. They seemed to be developing body ideas and awareness. For example, one of the boys who had had immense difficulty during the "fall backs" was able to mould and move the "statue" and made a strong effort at keeping up with what was being done. Some of the "statues" were quite interesting. One group made one of the youngsters into a person who was riding a horse, another into a wagon, a third into a baseball player swinging a bat. In several instances the staff members became the "statue" or "sculpted" another staff member so the kids could copy from the model. There was much interaction and exchange of ideas

on what was happening and what was being done. Following this we "flopped", but this time first the triads, then moving into two groups for discussion. Within the groups, the kids tried out what had been done, exchanging ideas, information and experiences. They would try to gain and exchange not only on a verbal but on experiential basis. That is, doing as well as talking.

Our forth session was July 22, 1968. Mrs. Anita Abott (Teacher of dance, drama and body movement at Roosevelt University), volunteered to come and give the children some taste of dance and movement, using some of her ideas and techniques. The first thing she had them do was stand up and yell. She then had them put their arms out to get some space between them, then clap their hands over their heads and shout. The basic idea was to get them to do things on the exhalation of breath. They were to put their entire body into what they were doing, acting as a total organism. She had them kick their legs with the knees straight up to the chest and yell; had them jump up in the air (a cheer leader jump); kick their legs straight up, ballet style, walk using "heel toe" (developing some idea of balance and grace, etc.). In all cases, the attempts were to get the youngsters to work as a total person. The kids really seemed to go for this and put a lot into jumping and kicking. Several boys and girls who were quite fearful and awkward in earlier sessions, did some magnificent high jumps. There was a good deal of shouting going on, also only here the kids seemed to be shouting with their entire bodies e.g., not just with the voice.

We had them pass a ball around similar to what we had done the previous week. This time we had them pivot, pass the ball into each other's hands and shout; as they did it Mrs. Abott also tried to show them how to walk correctly and develop balance. Then we had them hold the ball as though they were bowling. Usually when the children bowl, they walk to the edge of the bowling alley (holding on to a railing), stop, swing the ball several times and then throw it. The ball usually would either slowly dribble down the alley or go off into the gutter and in general the scores averaged two, three and sometimes four pins per ball. On rare occasions they would get strikes, but for the most part they would do very poorly.

We had the youngsters try taking four steps while counting four aloud. On the count of four, they were to throw the styrofoam ball. We incorporated what Mrs. Abott had been teaching them, using the "shout", using the steps she had shown them and putting themselves into it, while throwing. Within a short time many were able to throw the ball quite straight and hard. Our camera man stood in front of them and told them to throw the balls at him. The youngsters spontaneously started to shout "Let's get Shea" (John Shea, mobility intern from Boston College, who was acting as our camera man). It was exciting to see the children using using so much of what had been happening, not only in this but in earlier sessions as they threw the ball straight and hard. Many did "get Shea".

In the two weeks that followed this session was found that the kids were making use of these techniques in bowling, and walking. Their bowling

scores increased dramatically. That is, those who had taken part in the sessions began to average six to seven pins per ball. They had fewer gutter balls and some began getting strikes and spares. They stopped using the railing but would position themselves in the middle of the alley, take the four steps and began to throw the ball with a good deal more power and accuracy.

Our fifth and last session on July 29 was one in which we tried to use examples and exercises from earlier sessions. We decided to start this session with a "walk around" to the music of the William Tell Overture. We used the final section, "The Lone Ranger" and told the kids to get with it and scream and shout with the "Lone Ranger". They threw themselves into the music, bouncing up and down, jumping down, running back and forth with complete freedom and abandonment. They bounced off one another, jumped up, pushed one another around and had a gay old time. The differences in their movements between the first and last sessions were somewhat unbelievable. In the first session "walk around" they were hesitant, fearful, slow and quite tight. In the last session they moved with abandon, swinging their arms and legs to the rhythm of the music, and without any apparent fear of possibly hurting themselves or fear of falling. They seemed to have confidence in their ability to handle the world and not be hurt. After five minutes of this we had them flop with a yell and the kids dropped hard. Then some got up and just threw themselves down again. Several tried the fall back not really being concerned whether anyone was behind them but landing on the mat, jumping up with a big smile on their faces and trying it again.

Mrs. Abott returned for this session and she tried a basic dance and ballet step called "Say Sway" teaching the kids how to move to a basic dance rhythm (Jazz walk #1 and #2). Roughly it went: the youngsters formed into a circle, swayed left, then right, then same with hands over head, turned around, held hands while swaying, turned back into a circle, and bowed from the waist. The idea was to get the basic rhythm. After several "Say Sways", we paired them off and had them dance to the record (jazz walk 1 and 2). Most of them began to dance naturally and quite rhythmically to the music. These were the youngsters who had often asked for ballet dance lessons from their parents but who had been refused. Many parents seem to feel that "they can't see so what do they need to know about dance." Here is another societal stereotype re: the blind. Some of the youngsters had been allowed to take tap lessons because they could hear tap. Therefore, this made this type of dancing all right for a blind person, "If they can hear it, it's o.k."

In our society many average, middle class preadolescent girls are given ballet lessons more for grace and poise, than to actually dance. With our girls this is not true - they can't see; there's no use learning ballet. However, they are allowed to play musical instruments (piano; guitar, accordion) and some are quite expert at that. Again the stereotype that the blind can play musical instruments because they have "a good ear". We

find that they cannot do many other things which are essential but they do know how to play the guitar, piano, etc.

Even the youngsters who were markedly regressed or somewhat disturbed (it must be noted that the majority of the kids had average or above intelligence and were quite well adjusted except for these severe experiential lacks) were able to get the concept of dancing and moving their legs correctly and got the rhythm of the music. We had a small tomtom and one of the youngsters came over and started to keep time, beating out the rhythm for the rest. We had the children change partners several times or dance with the staff. We also had them try to help one another. It may be noted that later on this week the children had a dance party in which they used the same steps, did quite well and enjoyed it.

Mrs. Abbott had said that many of the children did better than some of her professional dancers and it was felt that many of the children were quite ready at this stage to learn more advanced dance steps. They had gotten the concepts of which was their left foot, right foot, and how to move themselves as a total organism in time and with someone else.

When the dance was finished we had them do the "pushups" without anyone giving resistance, pound and tug of war in which we fixed it so the ropes parted so they fell. They did much better and worked more as a team in this tug of war, pulling in unison. For a final activity we had them bowl the styrofoam with our camera man as a target. Finally we had them flop with a shout telling them to bounce hard. This they did throwing themselves to the ground with a scream, bouncing up and doing it again.

One little girl who usually speaks in a whisper but who had been one of our most graceful young girls in dancing, and doing the flower, etc. came up with a most earsplitting scream as she threw herself to the ground. When we discussed this with her she said that she did not realize that she could shout that loud and it really felt good. Then she let loose with several more, grinning all the time. Although she was very graceful and moved with marvelous rhythm, she was thought of by her mother as being clumsy, awkward, and grotesque. Prior to these sessions, she would walk in a slouch, often hiding her face with her hands, just shuffling along. She was quite frightened and fearful that she was doing things wrong and became easily panicked over anything new or different. She took to the "Happening" like the proverbial duck to water.

On Parents' Day (the last Saturday of the program) we had a "micro Happening" for benefit of the parents. We did "walk around" with the "Lone Ranger", throwing the styrofoam ball, and dancing. For the dance, "Jazz 1 and 2" were used. Then we cut into a Herbie Mann record of "cool" jazz. The children continued to dance with one another, not missing a beat. Then we had the parents come up, unknown to the children, and cut in and dance with them. The parents were rather astounded at the grace and ease with which their children danced.

We have tried to describe some of the things done during the Sensory Awareness "Happening". Our goal was to experiment, and to allow the youngsters to try things they, perhaps, never had tried before. By filming and presenting this, we hope to show that the visually handicapped, and congenitally blind, have many potentialities which are never tapped because of the stereotypes, fears and anxieties of their parents, teachers, society. These kids are average teenagers with the needs and desires of any teenager to grow, experience. We can't say that it was only the "Happenings" that caused whatever changes we saw. These children were going through a total program at IVHI and we are quite sure that all their experience had a positive effect. We do feel that what we did contributed to whatever growth improvement or happiness that these youngsters may have gained. Our idea was to show it's fun to be alive and that a person can do many things irrelevant of physical disability. We started with both fears and hopeful expectations. We found our fears unfounded and our expectations far outstripped. As has been shown again and again, if given a chance, if allowed to grow and given the freedom to be, the human individual can truly become adaptive to all circumstances.

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PERCEPTUAL-MOTOR LEARNING OF THE BLIND

by

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A survey of the research (8) (10) (13) (15), together with an appraisal of recent findings emanating from our laboratory (1) (2) (3), are beginning to suggest a framework to which a comprehensive program of spatial-mobility education for the blind may be affixed. It is believed that such a program should rest upon several basic assumptions.

1. The blind lack the input system which is generally considered to be the most efficient one in the processing of information about space.
2. The blind, in common with other handicapped individuals, must rely upon intact capacities to a larger degree in order to interact effectively with events and objects.
3. The blind, in common with other humans, have the ability to think, to synthesize information and to form cognitive bridges between various facets of their environment to which they are exposed. Thus, education of the blind should not consist of merely training in techniques, but should consist of imparting information important in the acquisition of spatial concepts.
4. The education of basic concepts about space should include activities designed to impart information relative to near and distant space, opportunities to acquire knowledge about the shapes of objects, and also educational procedures whereby they may integrate concepts of time, movement and distance as they learn to move through space.
5. Initial education of the blind child must of necessity be non-verbal in nature. When he acquires the ability to communicate verbally, however, spatial concepts should be talked about and thought about when practiced.
6. Movement activities, verbalization, tactual explorations, the organization of sound, and thought should all be included in programs of spatial education for the blind.
7. Operationally, a program of spatial education for the blind may be divided into four overlapping and related phases. The phase to which a blind individual is introduced, of course, hinges upon whether he has had any sighted experience, and upon his age, intellect and emotional make-up.

8. Identifiable educational goals, or levels of difficulty, are beginning to be identified within each of these four phases, which should provide helpful guidelines for educators.

Within the next few minutes we will consider these four phases and their component parts.

PHASE I: The Body and Objects in Near Space

Education during this initial stage should start at birth and should include movement and tactual experiences whereby the infant gains an early perceptual awareness of simple forms, and of the planes, appendages and movement capacities of his body.

Initially he should be made aware of the planes of his body as he turns, or is turned, in his crib to his side, front and back. Movements of his limbs should be encouraged via assistive techniques. The sighted child engages in hand-regard at about 3 months of age; the blind child is afforded no such vivid information about his upper limbs. Stroking the arms and legs and moving them should aid the sightless infant to better perceive his appendages.

Forms in near space should be handled, and mouthing them should be encouraged (with proper precautions). Objects of diverse shapes should be provided for manipulative training, as well as objects which impart noises so that the sightless child begins to become aware that he can cause sounds to occur.

More difficult tasks within this initial phase, and which overlap the second phase, should include the identification of body parts, and the left-right dimensions of the body. Goals toward the termination of phase I should include the identification of the left-right location of objects relative to the child's body.

Of particular importance during this initial phase is to provide experiences which will result in the acquisition of concepts relative to the bodies of others! The child should be exposed to "doll families", so that he may acquire concepts about the relative size of people, and that indeed other people have bodies which are in many ways similar to his own.

Guidelines for parents and teachers working with the blind child during this initial phase include texts containing information about the development of the normal child. The text by Espenschade and Eckert (7) for example, contains normative data relative to motor development, while the book by Kidd and Rivoire (11) contains a summary of the manner in which a normal child develops perceptually. The insightful essays by Piaget should also afford helpful signposts when attempting to work with the child who lacks sight from birth (21).

PHASE II: Simple Movements in Time and Space

As the child becomes mobile, and particularly when he acquires the ability to walk, he should be given tasks through which concepts of movement through

space may be acquired. At the same time he should be confronted with situations which inform him about the fact that at times other things, i.e., sounds, may also move while he may remain relatively fixed.

Our research (4) (5), as well as information from other investigators, suggest that several kinds of activities might be practiced in the presence of and in the absence of sound cues. Facing movements should be practiced, and in the latter stages of this second phase they should be practiced in relation to fixed compass points. Accuracy when making one half, one quarter and full turns both to the left and to the right may be improved in grade school children with minimal amounts of training (4).

Practice in more dynamic spatial problems employing locomotor activity should be engaged in also. Practice in walking straight, and activities to impart to blind children the concept of a straight line should be engaged in. Tactual braille of flexible wires illustrating the veering tendency has been found to be helpful with blind children in this phase of the educational program proposed (4).

More complex spatial problems may also be practiced. Position relocation problems involving the ability to remember a position in space after being led away should be helpful. Position relocation has been found to correlate with the simpler facing-movement and veering-tendency problems (6). Position relocation problems may be made increasingly complex as the child is first asked to relocate his position after being led along a triangular shaped pathway (the two legs of a right triangle) and then required to return via the hypotenuse; he then may be led along three sides of a square laid out on the ground before being asked to relocate his position. Increased difficulty may be introduced as he is asked to perform these tasks in larger amounts of space, and without the presence of orienting sound cues.

This second phase of the program in which locomotor activity is engaged in should contain tasks in which the child is given an opportunity to locate and to identify the nature of various noises to which he is exposed daily. The program outlined by the Schilling Foundation should afford initial guidelines for this second phase of the educational program proposed (23). The child should be exposed to sound cues of increasing complexity, both stable and moving cues, as well as environments in which more than one sound is present.

The final portions of this phase might contain problems in which the child is asked to move accurately (i.e., walk straight) in the presence of both stable and/or moving sound cues, similar to the conditions he will later encounter on the city streets.

Important during this second phase is to impart to the child the concept of scale. If he is asked to walk a triangular shaped pathway, as described, he should be afforded the opportunity to tactually inspect a small triangle and in other ways be encouraged to acquire the concept of triangularity prior to attempting to project the concept into larger space when he is asked to walk

through a large pattern enclosed by three lines he cannot see. If the amount of veer he evidences is communicated to him via a small wire super-imposed on a hand-held grided surface, he must be aided to gain an awareness of just how the grid corresponds to the walking face he is walking upon, ie., how many steps must he take to equal one square of the grid he is tactually inspecting?

PHASE III: Complex Spatial Judgments

The third phase might contain various map-reading tasks similar to those described by Alfred Leonard (13) (15). Using braille maps, and other indicators, blind children are being taught to find their way around villages in England. They are being taught about space so well that they are able to take detours and still find their way from one point to another. When carrying out this training it has been found that again concrete teaching for tactual-to-mobility transfer must be engaged in. Simply handing a child a braille map of the village streets did not suffice; for there were no bumps on the sidewalks corresponding to those on the maps! The child first had to utilize maps which had raised foam plastic ridges which corresponded to the building lines he found in the real world, prior to being introduced to the braille street maps. They had to be helped to transfer several concepts, for example, raised lines on maps equaled lines of buildings and of streets; raised lines on maps equaled lines of bumps on maps, and finally that lines of bumps on maps equaled street and building lines.

It is believed that this type of training should both precede and accompany traditional mobility education. It is apparent that as we have proceeded from Phase I to Phase III on our program that more conceptual than perceptual activities are involved, just as the normal child seems to develop motorically and perceptually prior to the acquisition of the ability to cognitively manipulate his environment.

PHASE IV: Mobility Education, in Complex Environments

The final phase should contain traditional mobility training techniques. I leave the elucidation of these procedures to other speakers more familiar with them than I am.

At the same time I believe that mobility trainers should be cognizant of some of the findings which are emerging from various research laboratories pertaining to the perceptual capacities of blind children and adults and at the same time should make themselves aware of more basic information available relative to human capacities to integrate and to interpret kinesthetic and auditory information as well as information gained from walking through and tactually inspecting the environment.

For example, innumerable research studies have demonstrated that accuracy in kinesthetic judgments gained as an individual explores the space field to his far left or right is less accurate than kinesthetic judgments made directly to the front of the body (9); and yet, one of the techniques sometimes

seen requires that the cane be held vertically and passed from hand to hand as the blind client faces the curb, thus requiring that he judge the curvature of the curb primarily from cues obtained as the cane is held at arm's length to either side.

After testing about 200 subjects, we have found that leg length, arm preference and habitual head positioning are not related to the direction of the veering tendency (2) (6), and yet mobility trainers are still placing heel lifts under the short leg of their clients to correct veer.¹

Furthermore, our findings indicate that the blind are more sensitive to deviations of the pathway walked in a vertical plane (of declination and inclination) than are the sighted when inspecting and walking on these same surfaces. At the same time it is obvious that the blind can be expected to be far less sensitive to deviations in a horizontal plane as they walk (veer, curvature in pathways, etc.), than are the sighted. Consideration of findings of this nature should result in improved communication between mobility trainers and their sightless clients.

Summary and Conclusion

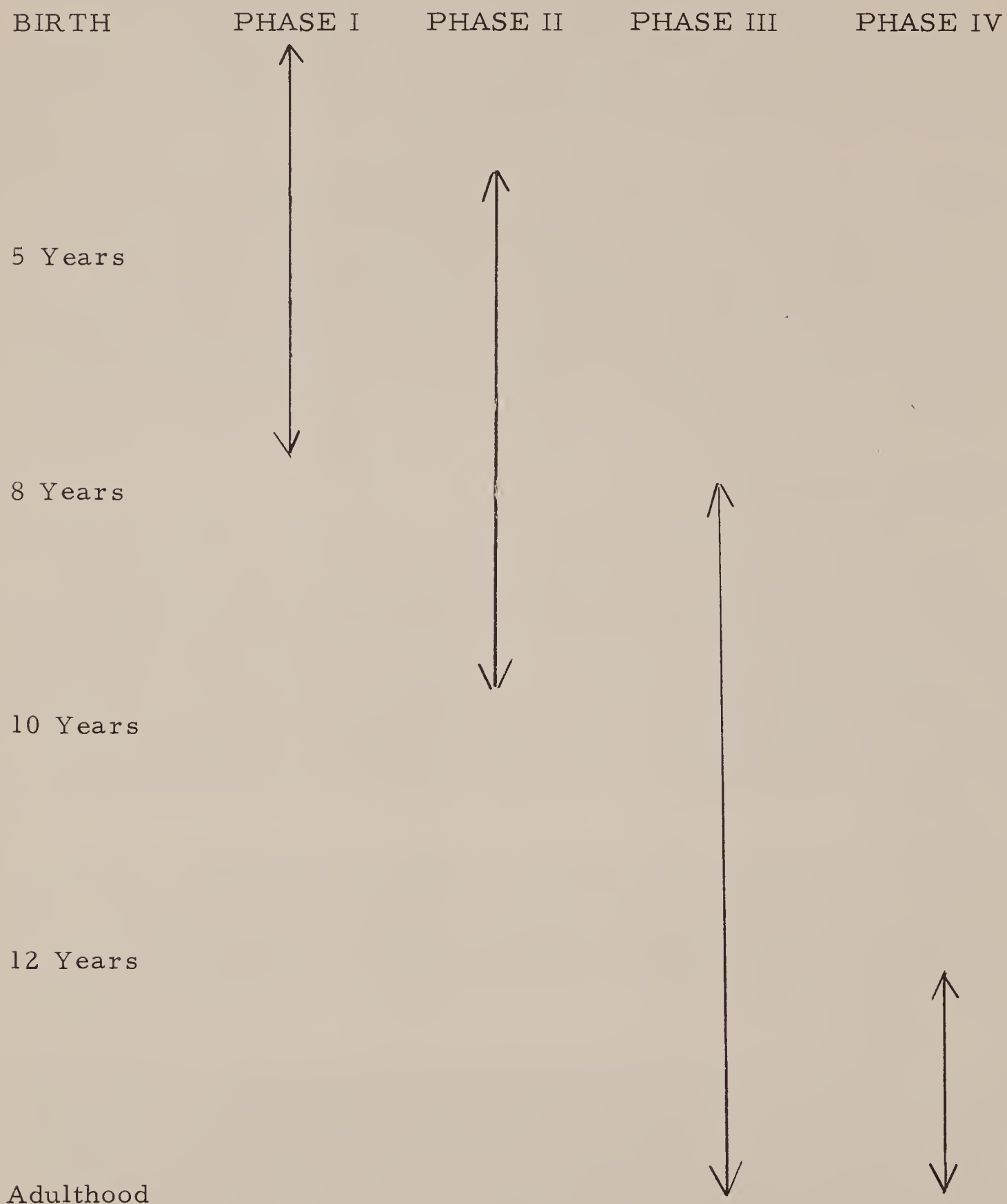
It has thus been suggested that a four-phase program of spatial education for blind children and youth be considered and that within each phase are contained identifiable "signposts" which must be passed before the next phase is begun. It is not suggested that spatial education constitutes the totality of the educational program for blind children, as indeed standard school subjects, speech, braille reading and writing are vital. At the same time it is not very helpful to prepare a blind high school student for entrance to college by only emphasizing academic excellence if he cannot find his way around the college and university campus.

Progress through these phases must be carefully evaluated by consideration of the research available on blind children as well as by consulting normative data to which sighted children have contributed. Alfred Leonard's summary of techniques through which travel skills may be assessed is a helpful step in this direction (15).

But above all, I am proposing a central theory of education, rather than a peripheral theory, in which movements are simply imposed upon the blind and techniques trained. At times the rationale underlying such perceptual-motor, mobility, or "educational" programs for the blind seem to ignore the fact that indeed both blind children, youth and adults think about what they are doing, where they are going, what is happening to them, and what they can make happen to their environment. I believe that movement experiences, together with auditory training, are important components of the spatial education program I have proposed. At the same time, movement without thought and listening without interpretation lead nowhere.

¹ It is probable that this method will indeed correct veer to some degree as the client is afforded cognitive information about his direction of veer, as he is "jacked up" artificially.

APPENDIX

SUGGESTED AGES DURING WHICH VARIOUS PHASES OF THE SPATIAL
EDUCATION PROPOSED MIGHT BE ADMINISTERED¹

¹ Determination of the exact chronological age during which the various phases might be appropriate, of course, should be determined by evaluating the present skills, past experience and mental and emotional capacities of the blind individual dealt with.

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THE BIOMECHANICS OF POSTURE

Applications to Mobility in the Blind

By

Irwin M. Siegel, M.D.*

The great neurophysiologist, Sir Charles Sherrington, once said that all movement begins and ends in posture. It is not empty rhetoric to refer to posture as an expression. Posturing is the principle method of communication among pre-human anthropoids, and in modern man plays an important role in the expression of attitude. By posture I mean a process, not a condition. This process is one of stabilization in motion as well as at rest. In this way, an individual experiences the environment and conditions his response to it, his direct response, his expression if you will. In dealing with the problems of posture, particularly in the blind, one must consider several "spaces". Close space (space within which an individual manipulates) and free transport space are separate compartments, each with its own problems. Solutions in one cannot be transposed to the other.

An infant's posture is determined mainly by reflex mechanisms. Such basic reflexes as the tonic neck reflex are strong in the newborn and are also found in adults with central nervous system damage. The development of binocular vision in the growing animal subserves the need for spatial orientation and gradually supplants the responses of reflex activity in orienting the organism and maintaining balance. Generally speaking, upper extremity postural reflexes are lost at an early age while those in the lower

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extremities are slower to decay. Although this complex reflex activity is disengaged, so to speak, in the sighted adult, it is nonetheless present and active at times of special need.

It is our contention that the tonic neck reflex is operative in blind individuals (particularly those congenitally blind) most of the time because a special need is present. In other words, the experience and expression of posture in the blind is predominantly regulated by those reflex mechanisms which vision supplants in the sighted. Those with sight don't require them; the blind do. This represents an anthropomorphic detour back to an earlier technique for stability. These positive supporting responses and other statotonic reactions constitute the balance armamentarium of the blind, and the compounding of these reflexes is the basis for their coordination.

Now, human gait represents a closed kinetic chain in which there is an alternating loss and recovery of equilibrium. During the rhythmic play between swing and support in the lower extremities, accompanied by a shift in the center of gravity and resulting in forward propulsion and elevation of the body, postural reflexes are called into action. The ultimate refinement of these operations is the achievement of movement which is almost fluid and accomplished with the least possible expenditure of energy in a state of near relaxation. This is what we aim for. But to realize this cosmetically and functionally desirable condition, an individual requires three things: First, adequate spatial orientation including a valid concept of vertical; second, well conditioned postural reflex mechanisms; and finally, an appropriate and accurate body awareness against which stance and motion can be patterned. The blind are often wanting in these requisits. If any sighted individual doubts this, let him attempt travel while blindfolded.

Persistent malposture in the blind may cause discomfort or deformity and create serious difficulty in orientation and mobility. Thus, any program designed to teach travel to the blind is incomplete unless it considers these problems, and any method for treating postural divergency which does not include techniques acknowledging postural reflex, vertical concept, and body image is inadequate.

Such techniques may include specific exercise programs, reflex splinting, and postural reconditioning, aimed at improving the individual's kinesthetic spatial orientation. Although faulty body mechanics can initiate difficulty in segmental alignment and subsequent postural problems, good posture is almost always synonymous with adequate kinesthetic awareness.

Some understanding of the essential features of normal locomotion is important to anyone dealing with mobility training in the blind because certain problems of posture are different in degree rather than in kind from the same problems in the sighted.

Three basic concepts must be understood. 1) the influence of gravity, including the center of gravity; 2) the problem of swing and support; and 3) body rotation and the ground force (the frictional force that orients body movement).

Walking is an alternating loss and recovery of support with a series of displacements of various body parts in several planes. The brain, kept informed by the sense organs, directs the muscles to modulate the effect of gravity on body momentum. Shifting of the center of gravity during locomotion and body movement in relation to this are important.

The tendency of an individual to fall forward while ambulating depends upon several factors, 1) his body weight, and 2) the distance of this weight anterior to the spinal column. However, the spine is not a rigid column, and the various distortions resulting from the forward pull of the load of the human body constitute the basic conditions inherent in all postural studies. The application of these simple facts in the evaluation and treatment of postural difficulty in the blind is obvious. When a student leans forward or backward, he does not bring the center of gravity as near as possible to the supporting column of his spine. Leaning makes for imbalance. Of course, no one walks or stands perfectly straight, and there is a large margin of normality. The best choice is not the same for each individual.

Another biomechanical rule which must be obeyed, else we cannot remain upright, is that the supporting surface must be large enough to intercept the line of gravity of the body. This is well observed in the leaning tower of Pisa. It accounts for some of the wide-based gait seen in children first learning to walk, in individuals who are overweight, in pregnant women, and in anyone walking up a steep incline. The blind frequently walk with a wide-based gait to increase their effective supporting surface, so the center of gravity will fall within it, thus facilitating the upright stance.

The lower the center of gravity lies, the greater must be an arc which an unbalancing force must describe. Those of our students who walk with a bent knee gait are trying to lower their center of gravity to better maintain balance. However, anyone who stands or walks with flexed joints overloads his postural musculature. This is one of the reasons we like to have relaxed adequate posture; otherwise, standing and walking can be enervating.

In an alternating two-legged gait (bipedalism), the abandonment of the forelegs as a means of support is conditioned upon elevation of the center of gravity, so that it lies over the supporting area of the two feet. The upper extremities shift and balance the trunk over the pelvis, and the arms swing, transferring momentum from one side to the other to prevent undue twisting of the body. If one walks with his arms straight

to the side, the body has to twist to shift its weight. A tightrope walker uses an extension of his arms to transfer momentum so he does not have to shift at all. It could be very dangerous to shift even a little on a tight-rope.

Therefore, bipedalism is a combination of rhythmic forward propulsion and elevation of the body. In alternating bipedalism, only one lower extremity is used at a time, either as a propelling or restraining force. Propulsion is carried out by a leg placed on the ground in a backward diagonal direction, and restraint is produced at the same time by setting the other leg in a forward diagonal direction at the moment the propelling leg is prepared to leave the ground. Start and stop, heel and toe.

A rapidly growing blind child is awkward in his movements because he has a poor discriminative appreciation of spatial relationship and is, therefore, totally oblivious of grossly faulty posture. He does not have the vocabulary or the experience.

Even minimal conditions of malposture can eventually lead to pain and disability through incongruity in joint surfaces eventuating in overstretching and weakening of supporting ligaments with muscle weakness and fatigue. In addition to this, rather severe difficulties in orientation and mobility result from advanced postural problems. It has, in fact, been noted that even such minor movements as nodding the head and twiddling the fingers modify the performance of the lower limbs during locomotion.

Some of the problems commonly seen are as follows:

- 1) Dorsal round back (kyphosis), often due to a structural problem that cannot be helped by exercise. Sometimes bracing may be necessary.
- 2) Twisted back (scoliosis), yet another structural problem which may occasionally require operative correction.
- 3) Flat feet, often correctible through proper foot wear.

I mentioned these three problems because they illustrate the necessity of conducting an adequate orthopaedic examination of each blind student. Frequently, the correction of a common orthopaedic problem is all that is necessary to improve posture in the blind.

However, as I noted before, much postural divergency is particular to the fact of blindness. Specialized techniques are necessary in the treatment of this pathology. Such methods aim at teaching the student the feeling of proper posture. Reflex splinting is sometimes used, as well as weighting an extremity to correct the tendency toward imbalance. Apparatus which points the chin, exploiting the tonic neck reflex can be

used to advantage. Exercise programs which increase proprioceptive awareness and avoid the enervation of static holdings are of value. The military stance is something to avoid. We strive for relaxed, functional posture.

The brailling of full-size mannequins is an excellent way to demonstrate the body in space and refine a student's body image. Motion proceeding from a fixed reference point, such as a wall or the floor, and often performed in front of an electric fan, increases kinesthetic awareness of the position of body parts in relation to one another. Cane practice conducted barefooted on rubber mats or other textured surfaces facilitates the training of proper gait by augmenting kinesthetic input through the soles. Specialized recreational programs, particularly skiing, fencing and trampoline drill place the student in space and refine his ability to balance. The use of crawling and cross-patterning techniques reinforces basic postural reflex strength.

In summary, through the exploitation of effective postural reflex mechanisms, including the conditioning of vertical spatial orientation and the development in each student of an appropriate body image, postural illiteracy can be remedied and effectiveness in orientation and mobility in the blind enhanced.

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MOBILITY -

GAIT, POSTURE and "THEM"

By

Robert H. Whitstock

This has been a remarkable conference, almost a psychedelic adventure, with insights about mobility glimpsed in graphic dimension. Traditional approaches have been replaced here by fresh new ideas, and the consequent admixture has, for me, been a stimulating and exciting experience. And yet I cannot help but feel that one avenue to a group perspective has been neglected; consequently, it is to dignity, confidence, and self-respect--the human factors, in other words--to which I wish to devote my discussion. To do so, I would like to discuss briefly my own particular thoughts about blindness, and to relate this philosophy to mobility in general and to gait and posture in particular.

Obviously, the lack of sight or its substantial impairment, constitutes a very serious physical disability. How serious the impact of disability will be varies significantly among individuals. But without doubt, one of the most vital problems blindness creates is a strangling

restriction on independent mobility. Such restriction, along with other interference with ordinary human function and expression, can seriously mar an individual's self-image. Many other influences contribute to the erosion of positive attitudes a newly blinded person holds about himself. Such influences include economic crisis, negative family reaction, personality, integrity, and the individual's past feeling toward blindness.

To look at the situation from the other direction, that is--from the individual's perspective--not only does blindness interfere with previously learned ways of doing things, but it can and often does shatter a person's confidence and sense of dignity. We at Seeing Eye have believed from the beginning of our program, now approaching its 40th Anniversary, that for a person to be genuinely independent he must not only learn the skills of mobility, but must also be motivated to make use of those skills. It troubles me to hear professional persons speak of "programming the learning process" or of "programming desirable human behavior." Perhaps as a concept borrowed from the developing computer field, this gives a rationalized perspective to an approach for rehabilitating or molding human entities, but its very use tends to exclude the human factor, which I believe is essential for rehabilitation. I, as a person, do not wish to be programmed, reconstituted or renovated. What I need is to learn new skills and to learn those skills under circumstances of dignity and respect, and to have the sure knowledge that those skills will help to lock me in step with the world. I believe the foregoing to be obvious truths, no less valid when applied to matters of mobility.

Often, when an adult loses his sight, techniques almost unconsciously develop which parallel some used by the congenitally blind child. For example, there is a tendency for a person to shuffle his feet as he moves cautiously, feeling his way through an environment. There is no question but that a slow shuffle has its merits in locating steps or obstacles, but its failure as a skill lies in its lack of social acceptability and in its humiliating impact upon a person's view of himself. In the same general nature fall the technique of dropping the head, or holding one's hands out in front of himself. It is far better to collide with a wall through the top of the head than through a direct collision with one's face, but the outstretched hands and the lowered head not only inhibit positive social interaction, but again shake an aware individual's dignity to its foundation. Mobility, then, must not only teach skills which work, but these skills, which by their nature as well as by the manner of their instruction, must give that person a positive and healthy regard toward himself.

Certainly, there are those blinded individuals who need direct orthopedic assistance. There are blind youngsters whose physical development has been so distorted that physical exercise and mobility training will not correct posture, gait or related matters. These persons need physical therapy or extensive orthopedic involvement. Still other persons need psychotherapy or various combinations of a disciplined team approach.

Nonetheless, there are others who need little more than the professional attention of a qualified specialist.

At Seeing Eye, where students enroll in a four-week course, very often profound changes in gait and posture occur. There are a variety of causes which underlie these changes, some of which are inherent to dog guide mobility, but others which relate to independent motion itself. How many of you who are mobility instructors have seen a transformation in your trainees? How many have seen a person's confidence and skill grow, the stride lengthen, the steps become more firm, and the shoulders go proudly back? Part of the change is certainly due to persistent instruction, but part of it, too, is due to the dignity and improved self-image with which a person sees himself.

At Seeing Eye students are given their dog guides on the second day of training and begin their work in a residential area of Morristown on the morning of the third day; consequently, the students are launched with fast pace into patterns of success and healthful exercise. The enthusiasm of the dog and the rapid pace of training cannot help but make a person take a longer and straighter step, and during even the few weeks that Seeing Eye training entails, perceptible improvements occur in such problems as toeing out and keeping the head erect. Many other factors, I believe, affect these changes in outer and inner bearing--aside from the momentum and effectiveness of Seeing Eye training. The philosophy of the organization is one that expects big things of blind persons, and radiates a belief that blind people can and do belong in their communities. Not only are the facilities comfortable, and the food and service excellent, but every policy is geared toward looking upon a student with genuine respect. This positive atmosphere cannot help but have a therapeutic effect upon a person's growing confidence and his awareness of his own worth.

Without question, there are large numbers of blind youngsters who need extensive and continuing help in order to develop a physique and personality commensurate with their capacity. Rejection, and more often over-protection, distort and stifle what might have been a natural and normal evolution of the blind infant into an effective adult. Inappropriate mannerisms, defective orientation skills, impoverished social experience and distorted physical development can characterize such a troubled evolution. There are other youngsters who have been born blind whose families and social environment have allowed the nature of normal child development to occur, and in such situations the mobility specialist's job can be relatively simple and quickly rewarded. For such a youngster, physical and emotional fitness is present, accompanied generally with strong motivation, and properly taught mobility--whether it be with a dog or a cane--can be just the catalyst to achieve for that person a rich and alive adulthood. But for the youngster whose physical, emotional and social growth has been stifled or distorted, the mobility specialist will probably need the assistance of many other professionals to achieve the objective of independence.

I believe this conference is remarkably appropriate in this regard, for it has brought together an array of thought and investigation, also experience and research, in a unique combination. None of us here can go away without the knowledge that we have been participants in a very unique experience, and I think we will all leave with a variety of insights.

I want to close with one parting thought which I believe ties mobility and human understanding together, and perhaps has some bearing on all human relationship. In a way, I think it ties my chosen topic of MOBILITY - GAIT, POSTURE, AND "THEM" into a finished package. Not long ago a fledgling rehabilitation specialist asked in, in all innocence and sincerity, "How can I develop a rapport with 'them' (meaning blind persons) and how can I understand what 'they' want?" My answer was simple and not entirely facetious: "If you stop thinking of 'them' as 'them', and start thinking of 'them' as 'us', I think you will be well on your way."

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THE USE OF MONTESSORI IN THE DIAGNOSIS AND TREATMENT OF PERCEPTUAL-MOTOR SKILLS IN THE BLIND

By

Rosetta L. Rietz

My preparation for applying Montessori techniques to blind adults here at IVHI has its origin in my work with brain injured children. The brain injured children to whom I have applied Montessori techniques are those children who have received some injury to the brain during the time shortly before, during, or after birth up to six years of age. The injury has resulted in learning impairment, sometimes, but not always, to the extent of serious mental deficiency.

The general characteristics frequently found among brain injured children are distractibility, explosive behavior, lack of organization and of purposeful behavior, disinhibition, perceptual difficulties, hyperactivity and drivenness.

Learning disorders are demonstrated in the visual or auditory sense, or both, in the brain injured child. Although the eye and the ear mechanism is intact, the injury to the brain, dependent upon its area and intensity, causes distortion of input through these sense organs. For example: A brain injured child who cannot guide his hands by his eyes must be treated like a blind child as far as manipulations and movements are concerned. He cannot learn any movements or manipulations by being shown how to

do them. He only conceives them if he actually does them or if they are done passively with his limbs. The child cannot imitate in any degree independently of visual control because he cannot guide his hands by his eyes. He must be taught to sort out forms and shapes without seeing them, to name objects after tactile exploration. By doing this we teach him discrimination of forms, shapes, and materials independently from sight and we teach him the use of his hands by developing muscle feel without visual control. Once he has acquired this and can rely on the intelligence of his hands, his hands will teach his eyes to see form.

Then, there are those brain injured children who are slow to gain meaning from static visual stimuli and have a very short memory for two dimensional visual impressions. Visual-motor connections are intact. These children are hyperactive who want to handle everything. They can imitate seen movement. They are manipulators. They appreciate form more than color and they love movement and noise.

Then, there is a group of children who are mute or have severe speech defects. They have difficulty learning to talk because word-sound patterns do not stimulate them to imitation.

And still another group of children who get little meaning from language. The auditory-motor connections are intact, they can reproduce verbal patterns, but they seem to attach little more meaning to them than does a parrot.

Needless to say, any particular child may suffer any combination of these problems and for this reason an individualized teaching program is indispensable with these children.

One goal for these children is to enable each one to achieve up to the limits of his actual ability. Basically, the Montessori Method is a valid educational approach for the brain injured children I work with as well as with the normal children. The line of sequence and development is the same--all that may not be the same, may be the pace. The following concepts in the Montessori Method demonstrate its validity in its application to brain injured children:

1. Work with the didactic apparatus provides sequentially ever-more complex sensory, motor, and intellectual exercise for sense training, muscular coordination, and mental development. The child practices to develop habitual proficiency in all areas individual and social leading to self-development.

2. The self motivated child strives for mastery of the self-physical and psychic, and environmental mastery, achieving auto-construction, self-development, and self-discipline through auto-education.

3. Sense training for perceptual efficiency, movement in muscular education, and applying knowledge gained through intellectual work all involve direct and indirect action, particularly of the eye-hand-brain connections. Concentration and tactile manipulation are also important in "learning to do by doing". By completing cycles of work, the child gains expressive efficiency.

4. Learning through movement includes the concept of the hand as the organ of intelligence. There is a muscular memory as well as an absorbent mind. Achievement in abstractions follows concrete involvement. The didactic apparatus can be thought of as materialized abstractions.

5. Analysis of movement, and muscular education foster poise and coordination. Mastery of one's actions links self-mastery and mastery of the environment. The "silence game" is an exercise of non-movement.

6. The child absorbs sensory impressions, then organizes them to form a prepared mind. Practice on programmed sub-tasks leads to mastery of larger units.

The great value of the Montessori material is that it presents the nature of the outside world to the child in such an orderly way that it assists his intellect to recognize the order in the world outside.

The purpose in designing the sensorial material carefully and scientifically is to give the child an order to the impressions he continually receives through his sensory apparatus.

Although I had no previous experience in working with blind adults before I began my work here, it was soon apparent to me how some of our blind population could take advantage of experiences with some of the Montessori sensorial materials.

The materials are particularly effective for that blind person who has been experientially deprived, especially during his formative years, from birth through six years. The person who was not allowed to experience the world about him through movement, touching, smelling, tasting, exploring. This kind of person has difficulty in mobility, and functioning in most of the educational areas in the Institute.



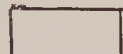
The Montessori apparatus has shown itself to be effective with blind adults with severe mobility and learning problems for the following reasons:

1. The sensorial apparatus, particularly the knobbed cylinder blocks, allows the individual to function at his own level and proceed at his own pace.

2. Because of the control of error inherent in the material, the adult student may not need the help of a teacher who would correct him-- a relationship an adult student may very well resent and would perhaps inhibit exploration and development.

3. The precise and scientific grading in dimension and shape in the Montessori sensorial materials allows the blind adult student to make his sensorial impressions of dimension and shape more refined and concise.

4. Again, because of the precision and static quality of the sensorial material, concepts of dimension and shape can be connected with precise and accurate terminology.

5. A blind adult who has problems in mobility, who has been experientially deprived, demonstrates his problems in his unwillingness and/or inability to investigate, to explore. His attention is focused on only a small area directly in front of him. By arranging the cylinder blocks in a , then a , and then a , the student is forced to see the whole of a thing, or a problem, and to continually keep the whole in mind as he works.

6. The inherent order in the Montessori apparatus enables the disorganized blind adult who has problems in solving problems, however small or great in life, to organize his thinking as he concretely must organize a procedure in solving the problem of working with the material before him.

I would like to read my summary of the procedure that I developed in working with the blind. The purpose of this research was to evaluate Montessori testing as a method of predicting orientation and mobility aptitudes in the blind and as a technique in improving perceptual motor ability which might increase such skills; the apparatus I used are four knob-cylinder blocks. Each set contains ten cylinders and they differ from other sets in one or several dimensions as follows:

- A. Each with the same diameter rising in height successively from short to tall.
- B. Each increasing in diameter successively from thin to thick, height remaining equal.
- C. Each increasing successively in diameter from small to large while diminishing in height from tall to short.
- D. Each increasing in diameter successively from small to large while increasing in height.

The Method. The subject sat at a table with a cylinder block before him. The block was described in terms of its function, operation and properties. He was then told to explore the set by answering these three questions: (1) What are the boundaries; (2) what are the properties; (3) what are the patterns? When the subject answered these questions, he began to work with the set. Each subject could work at his own pace, and routines were suggested only when working and thinking patterns interfered with progress and development. Now I would like to take one man as an example; a young man whom I worked with who seemed to be one person who really seemed to profit from this experience immensely. He was a 27-year-old man. Originally, I devised a general evaluation which is the following: Ranges were scaled from one to four. One was below 25% or very low; two was low-average; three was high-average; and four was very high. However, while I worked with these people on this piece of equipment I began to notice so many other facts about them that I further refined the evaluation to include the following information:

ATTITUDE: I could tell whether they were interested and enthusiastic, whether they had poise or were calm, and if calm were they friendly, were they listening, were they able to accept instructions and did they try to make an effort to improve. This particular person gave a total score for the first time of 3. Even though he was very nervous and apprehensive because he had had a miserable experience in his schooling, it seemed like he still had enough spark to want to learn and try. This is what I wrote about him: "Although Tom was extremely nervous and apprehensive over the new testing situation, interest and enthusiasm increased as he made some successful moves. He tried very hard in listening and accepting instruction and made great effort to improve."

WORK PATTERNS: Work speed was taken into consideration, concentration, comprehension, consistency, following instructions, retention of instructions or memory, ordered approach to task, and whether he evolved a pattern and maintained it. Tom was very low in all these areas. He was extremely slow. I have never seen an adult work this slowly on a piece of equipment like the knobbed cylinder block. He needed to manipulate and feel and explore each cylinder. There are forty pieces altogether. He worked with all forty pieces--not all at one time; maybe with the first set, he would take three or four weeks and he would just go over each piece and feel it, hold it, and compare it with the next one and go over and over this procedure. It seemed like he really had to do this in order to integrate the quality that he was receiving through his sense of touch. Because there was no pressure and he didn't have to make a deadline, or that he was going to be marked or scolded because he wasn't making "progress", he felt at ease to do this. With help and repetition he did succeed in ordering his work approach somewhat and evolved a pattern and maintained it. The second time I tested him, which was two months later, he jumped up to four in all areas. From an extremely slow start, Tom was able to achieve high levels in all categories through continued effort

and exercise.

THINKING PATTERNS: This means how a student responded to the questions of investigation of boundaries, investigation of properties, and investigation of pattern or patterns. Tom again scored very low on this. His terminology and his concepts were inadequate. Because he lacked practical life experiences and sensory training, I am certain his thinking patterns showed up very poorly. Two months later when he was given another test, he scored four again. What appeared to be a complete lack of sensory ability was actually developed and learned through repeated experience.

PERCEPTUAL MOTOR ACUITY: Dual discrimination and perception of error. Tom scored very low again. Tom had severe difficulty in proceeding in naming qualities of short, tall, wide, narrow, shallow, deep, inherent in individual cylinders. His perception of a misplaced cylinder causing it to protrude two inches above the surface of the block, was completely missing. However, after repeated experience and exercises with the apparatus, Tom had gained the basic concepts of size and shape. Tom was an excellent example of what a proper educational program providing the necessary experiences for development and growth could do for an adult of 27 years of age.

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